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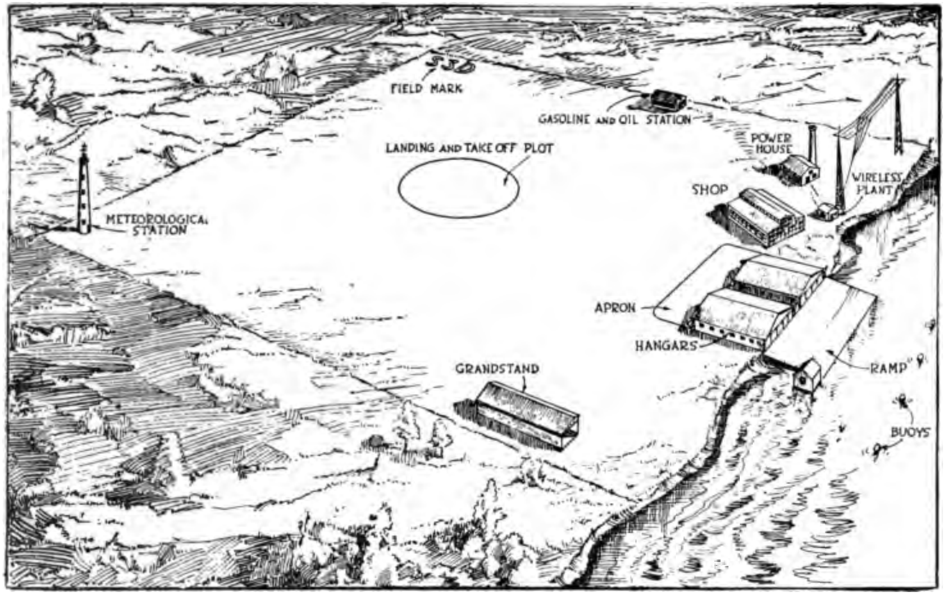

FULLY EQUIPPED AIRDROME FOR LAND AND SEA PLANES

A City with a waterfront should, if possible, locate its airdrome thereon so that accommodations for both land and sea planes can be furnished. Such as is shown above. Besides facilities for land planes, there is running into the water a ramp on which seaplanes can be launched and brought ashore.

HBH 17.5 E

FLYING GUIDE
AND
LOG BOOK

BY

BRUCE EYTINGE
HONORARY LIEUTENANT, ROYAL AIR FORCE-PILOT,
CAPTAIN, AERIAL POLICE RESERVE, N. Y. C.,
MEMBER, AERO CLUB OF AMERICA, N. Y. C.

With a foreword by
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MAJOR, AIR SERVICE
CHIEF, INFORMATION GROUP, A. S.
MEMBER, AERO CLUB OF AMERICA, N. Y. C.

1921 EDITION
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FOREWORD

THE greatest factor that is retarding the growth of commercial aeronautics in this country to-day is the lack of established landing fields. Landing fields are absolutely essential to commercial aeronautics. Airplanes cannot land in every field, so it becomes necessary to prepare fields suited for their landing and taking off. The important work of those few people, whose great interest and hope it is to see the development of lines of aerial commerce across the country, is to educate the cities of the country to their need for this new type of transportation facility. If the people of the various cities can be made to see the great advantages and profits that will in a few years come down to their doors, then will the growth of commercial aeronautics be made easy and rapid. So it becomes the work of everyone connected with aeronautics to place before the public the proper information to enable them to see the need of landing fields, and to secure interest and co-operation in their preparation.

The principal aerial routes so far developed are following closely along the natural land routes across the continent. It, therefore, should be urged upon those cities along these routes that they should be the first to establish fields.

The field itself should be given considerable attention in regard to the selection of its location. Much depends upon whether it has easy access to other forms of transportation. It should be located so that the traveler may transfer from a land route to an aerial one with the least trouble and loss of time. Fields should be selected that will not later be surrounded by buildings and other obstructions. The size of the field is also a very important item, for if a small field is selected along an important route, it may be dangerous for the fast or large machines that in time will want to make use of it. We cannot foresee, at the present time, the advancement in aircraft that undoubtedly will be made in the next few years and while much smaller fields may prove adequate through improvements in types, it is very necessary for the present builders of fields to prepare for the types now in use. The type of soil, the surrounding terrain, the obstructions to the approach, and the shape of the field are all vital points that must be given attention in the selection of any field.

The author of this book has outlined very concisely and thoroughly the important points to be looked after in flying cross country, along with the precautions to be taken in making preparations for the flight. His timely suggestion to educate the public in the "Safety Factors" of the new service is a splendid idea, and should be heeded by all those who have any connection with aeronautics.

October 1st, 1920.

HM Hickam
Major Air Service

Chief, Information Group Air Service

(U. S. Air Service Photo.)

Landing Field for a Town of Moderate Size.

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PAST AND FUTURE

When I was through with war and strife and finished with the army,
I said, "Henceforth my style of life is one that cannot harm me;
No, not for me the speedy plane I used to spot the Hun with;
A second-handed little Ford will do to have my fun with.
This thing of dodging through the skies has made me tense and nervous.
I'll make my tours in Pullman trains when I am through the service.
And bump to work in trolley cars like other city dwellers,
And thank my stars I'm not behind the blast of air-propellers.

But now—I'm thinking of the bus I used to roam the sky in,
That roaring, darting combat Spad that once was mine to fly in,
For she was swift and sure and true, a lulu and a darling,
And in my dreams I zoom aloft, I hear the motor snarling.
Ah, that was living like a man! a game of zest and danger,
While here, in all this humdrum round I feel myself a stranger.
Does someone seek the rainbow's end—the gold that lurks below there?
If I can have a plane to drive, I'll take the chance and go there!
A plane that's trim and swift and slim, as through the clouds I weave her
And till I crash in one last smash, you won't get me to leave her!

BERTON BRALEY.

INTRODUCTION

It is the author's intention to incorporate in "Eytinge's Flying Guide and Log Book" all available information that will be of help not only to the aviator but to all who are interested in commercial aviation and who are helping to develop it.

When you are preparing for a flight, consult the Guide. Take time and read over the "Helpful Hints" and "Don'ts." If you are preparing for a cross-country flight, say through the state of Pennsylvania, buy a state map and check off the places that are listed in the Guide as having landing fields and aviation facilities. To reproduce practical maps of all the landings and routes would require a large and heavy book.

Pilots should keep a complete record of every flight, as this is essential for the proper care and operation of both machine and motor, and is, above all, most essential for the pilot as a proof of his flying time and experience. Pilots should be and will be asked to show a certified proof of their flying to insurance companies and those to whom they apply for positions, etc.

By consulting your Army log book, or by writing to the Government, you can obtain a certified proof of your flying time. When you have entered the total in your personal book and have had it certified by a notary, you have a record of your flying time which you can continue and keep up to date.

Pilots should be proud of their flying record and want to add to it.

Note:—After this Guide has gone to press, new civilian or municipal landing fields will be established every month. The author will be grateful to anyone who will give him any information he considers valuable, so that it may be incorporated in the next revised edition. The Landing Field Report, as outlined on page 13, is suggested as a convenient form.

DON'TS

Don't fly if you can't walk straight.
Don't fly unless you are physically fit.
Don't fly without Goggles; you may not see it through.
Don't be a dummy; Yell, contact "ON" or "OFF."
Don't forget your Safety-Belt; Safety-First.
Don't zoom off the ground; try it on a cloud.
Don't take off in a climbing turn; the ground may follow.
Don't hurry-off without flying speed; start right and fly off.
Don't stall; use your Wings and fly.
Don't worry about coming down; it's a safe bet.
Don't invent new stunts; let GEORGE do it.
Don't be a flying fool; a damn fool is safer.

HELPFUL HINTS

Be conservative.

Educate the Civilian Public with the Safety Factors of flying.

An accident is a setback in the development of Commercial Aviation.

Never stunt an Airplane unless you are in flying trim and unless the Airplane is in flying speed.

Feel out your Machine and Motor thoroughly.

Fly your Machine; don't let it fly you.

Good pilots do not fly mechanically; they fly by feel.

Most Pilots fail to readily adapt themselves to different Machines and Motors of high or low horse-power and fly accordingly.

A Good pilot never stunts a Machine, new to him, the first time he takes it up.

Be conservative; especially when carrying passengers or flying low over a crowd.

It is better to be a Sky-Pilot than a Crack-Ace.

Be conservative.

"LET GEORGE DO IT"

Major Bartholf flying an S E 5 was the second contestant in the Transcontinental Air Race to reach New York in a single-seater.

His advice to young pilots is this:

In a reliability race, rely on yourself. Don't race your motor any more than possible and don't race your opponent. Supervise every detail of equipment. Choose your own tools, maps, spares and compass. If you want to get there, never "Let George Do It."

NECESSARY SPARES

It is not advisable to carry more weight than is absolutely necessary because extra or excess weight may cause a crash when taking-off or landing in a limited space. Some tools and spares are essential and very helpful to Pilot or Mechanic.

Every machine should carry, at least, the following: a roll of insulating tape for ignition, oil, water, or gasoline leaks. A pair of pliers, an adjustable wrench, a jet wrench, a screw-driver, a knife and an extra set of Spark Plugs. Emergency repairs can be made with the above, getting you home or to an Airdrome.

CROSS COUNTRY

If long cross-country flights are to be made over country unequipped with aviation facilities, spares should be carried accordingly; such as inner-tubes, valves and valve-springs, etc.

Cross-country flying needs more preparation and care in checking over machine and motor. Unless the Airplane has been in constant use and properly cared for mechanically it should be given a thorough test flight to insure that every part of the machine and motor is functioning properly; such as oil and water circulating. No overheating, ignition correctly timed, gasoline feeding and all controls in good condition; greased at pulleys and working freely.

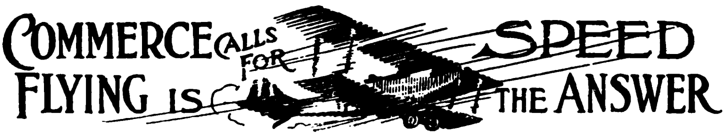
If the motor is new or old it should be warmed up slowly and flown accordingly. Valve guides and rocker arms must be kept well oiled. Valve springs, breaker points and distributor should be examined frequently. The gasoline line and carburetor jets drained and cleaned, making sure that the tank and system is free from dirt and water. Strain through chamois every drop of gasoline put into your tank and keep dirt from the oil.

Pilots in the Army Air Service depend upon their mechanics. Civilian flying depends mostly upon the pilots.

No mechanic realizes nor can appreciate the importance of having an Airplane in the best of condition unless he constantly accompanies the Pilot.

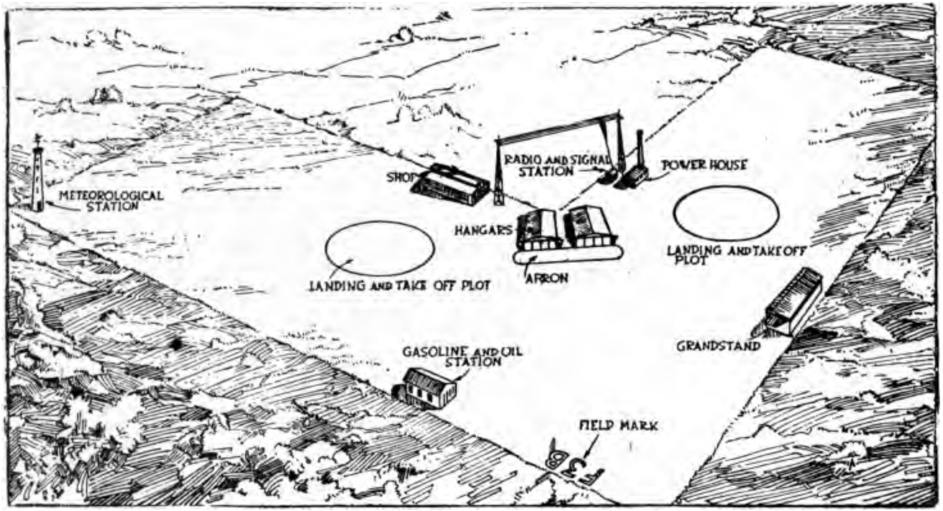
In flying over a new route carry a map if available or get a mental view of all possible landmarks. Always take-off into the wind and circle the field for altitude. In flight keep a look-out for possible landing fields in case of trouble and keep plenty of altitude as there is Safety in Height. Avoid storm clouds and especially fog if possible because of its hanging so close to the ground. On approaching; circle around your field to observe its surface and the direction of the wind so as to land into it. When throttled, to glide in, keep clearing out your motor so it will pick up instantly if needed.

When a forced landing is made always house and guard your machine when possible. If out in the open over-night or during a storm the propeller, motor and cockpit should be covered and the machine tied head into wind with control stick and rudder bar tied firmly in neutral position.



MAKE AMERICA SAFE FOR FLYING!

We advocate a Government, Municipal, Commercial or Emergency Landing Field near every City and Town of 1,000 population and over.



FULLY EQUIPPED ANGLE AIRDROME FOR LAND PLANES

High towers and smoke-stacks are dangerous in foggy weather. These and all buildings should be grouped together, with exception of gas and oil storage sheds, so as not to obstruct any approach to the field.

QUESTIONNAIRE

LANDING FIELD REPORT

Please type out a separate sheet for each Landing Field and mail to Bruce Eytinge, 4554 Park Av., N. Y. City, to be incorporated in the next edition of Eytinge's Flying Guide.

Date........................

1. City (or town)........................State...................
2. Altitude above sea level in feet...........Population.......,......
3. Local name of Field.........................
4. Private or Municipally owned or leased.............................
5. Distance and Direction from center of City named after.............
6. Shape and Dimensions in feet..................
7. Hangars and Markers, if any..................
8. Landmarks to locate field from the air (lake, river, bridge, R.R., hyway, tanks, buildings, race track, golf course, etc.).......................
9. Direction of prevailing wind..................
10. Can you land in all directions....... ....
11. Obstructions in or around field (buildings, tel. wires, trees, ditches, etc.).
12. Condition of surface and drainage................................
13. Is field, or any part, good in wet weather..........................
14. Availability and Quality of supplies.............................
15. Organization operating field (private, chamber of commerce, club, etc.)
16. Names of officials interested.................................
17. Names of aero firms using field..............................
18. Is this field open to all pilots...............................
19. Is field owned or leased by operating company, or used subject to good will of owner...
20. Name and address of owner....................................
21. Please mail an oblique photograph of the field, taken from the air, a city map, or draw a sketch showing shape, size, hangars, markers, etc.
22. Additional remarks...

AIRDROMES—LANDING FIELDS

The Field required for the landing of an airplane is a matter for individual determination.

The airdrome consists primarily of a landing field. Contrary to many reports, the selection of this field requires due care. Any old inlet is not a harbor, any old barn will not serve as a terminal, any old cowpath is not a state road and any old pasture will not do for a landing field. The field must be level and it must be well drained. Its location must be such that local air conditions are not dangerous. Its size and shape may vary.

The ideal landing field at sea level would be about 3,000 feet square, but this is not necessary. Two first-class landing fields are shown in the accompanying illustrations. In consideration of the landing field requirements, only the airplane has been considered, inasmuch as in general any field suitable for an airplane is suitable for an airship.

Airdromes should therefore be equipped with an adequate gasoline and lubricating oil storage station. Provision should, if possible, be made so that aircraft can be housed. For airplanes a hangar is needed; for airships, mooring towers or blocks will serve. The equipment of the airdrome with repair facilities depends, of course, upon the amount of traffic.

The marking of airdromes should be such that by night and day the pilot passing overhead will be able to identify and locate them. This will necessitate proper licensing and classifying of such and the issue of this "Flying Guide" corresponds in many ways to the Automobile Blue Book. With the growth of aviation airdromes will be as important to the community as its harbors, its railroad terminals and its roads.

The establishment of municipal airdromes is a logical step in the development of commercial aviation and of the community. Housing and repair facilities and fuel and oil stations can all be placed under private management if desired; but the landing field itself, with necessary equipment for safe landing and take off, is as integral a part of the community as its roads.

Communities first establishing airdromes invite to themselves aerial mail service, aerial passenger and express service, visits from pleasure-seeking aviators, and the many auxiliary benefits which accompany broadened field of action.

FLYING GUIDE AND LOG BOOK

WAR DEPARTMENT

OFFICE OF THE DIRECTOR OF AIR SERVICE,
WASHINGTON

January 1, 1920.

SPECIFICATIONS FOR MUNICIPAL LANDING FIELDS

In the selection of landing fields at a city, special attention should be given to the following points:

1. LOCATION:
   - (*a*) The field should be situated close to transportation facilities, both passenger and freight, and electric power and water supply should be available.
   - (*b*) An effort should be made to select a location in a place where the field is unlikely to be later surrounded by building operations.
   - (*c*) If the city is unable to provide for a field of the ideal size, if possible, a site should be selected which is capable of expansion to a larger size, when the development of aviation makes such expansion necessary.
   - (*d*) A special effort should be made, if possible, by cities on the main aerial routes, as the development of trans-continental aviation depends upon the establishment of fields at such points.

2. SIZE:
   - (*a*) The size of municipal landing fields depends upon so many factors that it is impossible to prescribe exact regulations concerning it, and it is realized that a great many cities will not be able to establish airdromes to meet the requirements of the specifications set forth herein. The minimum size recommended by this office at the present time and with the present types of machines, is one that will allow 600 yards "Runway" in any direction from which the wind may be likely to blow. Such a field would permit any type of machine at the present day to be landed by an average pilot, and to be taken off without accident, should there be no failure of the motor. To have a field large enough to enable the average

pilot to take any and all types of machines away from the field and to keep the machine always in such a position with reference to the field as to be able, in case of failure of the motor to return to it and to land the plane without accident, it is necessary that there should be a "Runway" of at least 1,000 yards in any direction from which the wind is likely to blow. Fields complying with these specifications are designed to take care of airplanes of all types under all conditions of traffic, weather, etc. These specifications are not intended to discourage the establishment of small fields, as the presence of small fields en route are of vital importance, and as such, they will function as emergency fields for airplanes that need a great deal of room to take off and land, and as landing stations for small or slower planes. In the establishment of these fields, the general specifications should be followed in regards to shape, character of ground, approaches, obstacles, etc. Should there be obstacles around the field, the portion of the field available for use will be shortened by a distance depending upon the height of the obstacle. An obstacle 100 ft. high will make at least 700 ft. of the field unavailable for use. The length of the "Runway" available for use should be computed by subtracting seven times the height of the obstacle surrounding the field from the length of the field in the direction in which the "Runway" is being computed.

(*b*) Another factor which enters into the size of fields is the question of the surrounding country. Should a field be located in a locality where there are fields available for emergency landings immediately adjacent to the municipal landing field, the danger of accident due to failure of motor, immediately in the vicinity, will be much lessened and the need of the 1,000 yard "Runway" is not so urgent. Should the country surrounding the field, however, be covered with buildings, or, be of such a character that it is impossible to land upon it with safety, the best interests of aviation demand that the field should be large enough to enable the pilot to circle the field in any type of machine, keeping always in such a position as to be able to return to the field in case of the failure of the motor.

(*c*) It would thus seem that it is impossible to make a classification of landing fields according to size, which would show their relative suitability for aviation purposes and, accordingly, all classifications heretofore made are withdrawn.

(*d*) In addition it may be further noted that there are types of machines with which it is possible for the average pilot to land in a field, without chance of accidents, with much less than a 600 yd. "Runway." It is also possible, with *average luck*, for good pilots to land any present type of machine in fields of smaller dimensions than 500 yards. It is not advocated, however, that any city go to much expense in preparing a field with less than 600 yd. "Runway," as it is feared that accidents will result in such a field and that public sentiment will demand at a later date that a larger field shall be selected.

3. SHAPE:

The best shape for a field is that of a square, but an "L" shaped field will suffice, provided each arm provides a satisfactory length of "Runway." It must be pointed out, however, that an "L" shaped field does not provide all the advantages for a return to the field in case of failure of motor, which are possessed by a square field.

4. CHARACTER OF GROUND:

The ground should be firm under all weather conditions. A light, porous soil with natural drainage is recommended as the most suitable. A field with clay soil invariably demands special drainage and is unsatisfactory as a rule during wet weather. It is possible, however, to lay a system of tiling which will drain any field after the hardest rain. The field should be covered with sod. The surface should be level and smooth, so that airplanes can normally land upon and taxi across without injury.

5. APPROACHES:

Surrounding obstacles, such as high buildings, high-tension power lines, trees, etc., limit the amount of field available for landing by the amount indicated above, and in addition provide an element of danger for the pilot in case of misadventure.

6. Marking:

A white circle, 100 feet in diameter with a band 3 feet wide has proven by experience to be an excellent distinctive marking for a landing field. This can be seen at almost any attainable height with clear visibility. By digging out the marker to a depth of about six inches and filling in with crushed rock, a very substantial and economical marker can be made. It is necessary to keep the marking clear white to make it show up well. This can be done by white-washing from time to time. The name of the station should be marked in chalk letters 15 feet long by 3 feet wide. A wind indicator, such as the standard aviation wind cone, should be placed at one corner of field 30 feet off the ground.

7. Accommodations:

Municipal landing fields should provide communication by telephone, transportation facilities, gasoline, oil and sundry supplies. Hangars, guards, and shop facilities will be needed in addition with the development of the use of the field.

8. Classification:

No classification for municipal landing fields will be published. However, for the purpose of consolidating information in a concise form and for the purpose of furnishing statistics, and furnishing pilots information as to cross-country routes, the following divisions will be made:

(*a*) Field from which it is possible for the average pilot to operate every type of machine, even in case of motor failure.
(*b*) Field from which it is possible for the average pilot to operate every type of machine without danger to the pilot so long as the motor functions.
(*c*) Field from which it is possible for the average pilot to operate only certain types of machines without danger so long as the motor continues to function. The most skillful pilots will be able to land any type of machine in fields of this classification.
(*d*) Fields, which of necessity, must be classed as "emergency fields," inasmuch as they are of such a type that only under the most favorable conditions can successful operations be effected.

WAR DEPARTMENT

OFFICE OF THE DIRECTOR OF AIR SERVICE
WASHINGTON

December 16th, 1919.

ORDERS
No. 53

GENERAL FLYING RULES TO BE OBSERVED AT ALL U. S. FLYING FIELDS

(*These should be observed by all Civilian Aviation*)

The following airdrome rules, based upon a careful study of all the existing regulations in this respect now outstanding in fields of the Air Service, are promulgated and will supplant from this date at all fields, rules now in existence.

It is pointed out that these regulations have been prepared having in mind brevity, simplicity and common sense, and express in rules what experience has proven to be necessary and applicable. In reducing the rules to a minimum a great responsibility is placed upon each and every pilot. It will be assumed that he uses his head and eyes at all times, and while in theory he has certain "right of way," in practice he must consider that there is no such a thing as right of way, and govern himself accordingly.

At schools and other places where students are being taught or when circumstances require it, commanding officers are authorized to make any and such further regulations as they may deem expedient, but qualified pilots from other fields cannot be held liable for violation of any other than the rules herein contained. Copies of such additional rules will be forwarded to this office for reference.

A. AIRDROME MARKINGS

1. The following permanent markings will be established on all Air Service fields and kept up carefully, clear and distinct at all times:
   (*a*) Wind direction flags or cones.
   (*b*) Large white circle.
   (*c*) Small red flags.
2. The following temporary marking will be used:
   (*a*) Landing T.
3. Wind direction flags or cones must be of at least three

(3) in number, widely dispersed over the airdrome, 15 feet in length, suspended over a background of such a color that the cone will in all directions stand out clearly, and well clear of all obstacles that might prevent a proper indication of wind direction. At least one cone will be kept in reserve on the airdrome ready for immediate erection, so that at no time will there be less than three cones of good quality flying on the field.

4. The large white circle must be kept clear and distinct and mark the center of the best portion of the field for landing, and the T, when used, will be placed in the center of this circle.

5. Small red flags will indicate bad portions of the field, and must be maintained fresh and erect on any bad portions of the field that might cause damage to an undercarriage or plane.

6. A landing T, when used, must be kept accurate and conform with the wind direction flags precisely. Use of a T should not be necessary except under special conditions, such as might be found, for example, when a lull in the wind occurs, and variable conditions present themselves when many machines are landing.

B. HANGARS

7. Smoking is prohibited in any hangar or on the field within twenty-five feet of any machine or gasoline container. Notice to this effect will be posted in large letters in each hangar.

8. Visitors will not be allowed on the flying field or in the hangars unless accompanied by an officer or enlisted man of the field.

9. In flight, machines must clear hangars at all times by at least 50 feet, and in landing come to a dead stop no closer than 50 feet from same.

C. MACHINES

10. Before flight, each machine must be reported "O. K." by the crew chief of that particular machine, or his duly authorized assistant, thoroughly familiar with that particular ship and its performance as indicated by remarks of other pilots who have flown same. This report to the pilot will be based not only upon the usual thorough inspection of the ship between flights, but also upon a final check up of such things as controls, safety-belts and air pressure.

11. When machine is turned over to the pilot he must consider it his charge, handle and protect it from damage as though it were his own personal property, and on returning from a flight leave it head in to the wind with propeller horizontal, and report all defects and make all suggestions to the same crew chief as above mentioned, and in addition, this information will be given by the pilot to this enlisted man's next superior officer (usually flight commander) or his duly authorized assistant.

12. No pilot will be permitted to fly any machine without instruction, unless he produces and files with the commanding officer, or the officer in charge of flying, a certificate signed by himself to the effect that he has flown that particular type or has unquestionable credentials to that effect.

13. No matter what knowledge a pilot has of any particular type of machine, he will never take it into the air until he is thoroughly familiar with the location and working of the instruments in the specific machine he is about to fly.

14. Machines must at all times be standard specifications and standard equipment, except when alteration is duly authorized by competent authority.

D. GROUND RULES

15. In starting an airplane motor, the following words will be used by the mechanic and must be repeated by the pilot in a loud and clear voice, and repeated where doubt exists:

(*a*) "Gas on" and "gas off."
(*b*) "Contact" and "switch off."

16. When the motor is running, no one will be allowed in front of the propeller or plane for a distance of 30 feet.

17. When a pilot wishes the chocks removed, he will wave his hand in front of him, parallel with the wings, rapidly; immediately mechanics will remove chocks but continue to hold wings.

18. When the pilot desires one wing held back he will point to it.

19. When the pilot wishes the mechanic to let go he will hold one arm above and in front of his head, pointing forward. Mechanics, however, will not stand clear on receiving this signal until they are sure that the air is clear in front from mechanics, and behind of machines about to land.

20. In taxying, the pilot must "S" and zig-zag as much as possible, to insure that no machine is obscured from view in the "blind spot" of the machine.

21. Pilot will never taxi closer than 100 feet to another machine unless a mechanic has hold of one wing.

22. In taxying out to take off, pilot will always be on the lookout for other machines landing and give them the right of way.

23. The pilot will not permit his mechanics to ride with him in the machine, except in one of the seats.

24. In taxying, the pilot will hold the stick back, and always be ready to switch off the motor in case the throttle or one switch fails; and in taxying, avoid insofar as possible throwing propeller blasts where they will cause damage.

25. After a pilot has landed he will make way for other machines landing, but will avoid sharp turns which might endanger other airplanes in their work.

26. Except on permission of the Commanding Officer, no two enlisted men will occupy the same airplane.

E. RULES OF THE AIR

27. In all flying the pilot will use the utmost care at all times to see that he is flying properly, that the motor is functioning smoothly, and that no other machine is flying in his proximity on the same level above or below, unobserved.

28. Except in combat, machines will pass one another at not less than 100 yards distance.

29 Machines approaching head-on pass to the right; machines overtaking other machines will pass to the left.

30. Normally, a pilot has right of way over any machine which appears on his left (port side), or above, and must give way to any machine which appears on his right (starboard), or below him.

31. In coming in to land, a pilot must never cut in on another airplane that is gliding and about to land, and when gliding for his landing must give way to any other machine that he may observe in close proximity, which is attempting simultaneously to land.

F. FLYING LIMITATIONS

32. No low flying will be tolerated over towns or cities, and

on no account will a pilot fly over a city or town without sufficient altitude to reach a known landing place.

G. ACROBATICS

33. Acrobatics will never be performed in training planes below 1,500 feet, and in service planes below 800 feet, and when performed at the minimum altitude the pilot must be within gliding distance of a sure landing field.

By direction of the Director of Air Service: V-1334, AS.

WAR DEPARTMENT

Office of the Director of Air Service
Washington

February 19th, 1919.

Orders
No. 5

CROSS COUNTRY-FLIGHT REGULATIONS

1. This order supersedes all previous orders, letters, circulars, stencils and memoranda which have been issued by this office on the subject of cross-country flying, except stencil W-143, A.S. (Revised) and War Department Standard Forms Nos. 331-A and 335. Commanding Officers of all flying units are responsible that the flying personnel under their command are instructed and are familiar with the provisions of this order.

AUTHORIZATION

2. Commanding Officers of Air Service Stations will not authorize cross-country flights for other than routine training purposes, without obtaining the prior approval of this office in each case. "*Routine training purposes*" will be interpreted to include such flights by qualified or student pilots, as in the mind of the Commanding Officer can reasonably be considered part of the training of the individual concerned, but such flights will not be permitted when the expense involved is out of proportion to the amount of experience and training gained. The distance of flights authorized by Commanding

Officers is not to be to any point of greater distance than five hundred (500) miles from home station, and such flights must not extend across the border of a foreign country or possession without permission of the Director of Air Service.

Exceptions to this paragraph with interpretations follow:

(1) Special duty flights.
(2) Authorized patrol flights.

(1) *Special Duty Flights* will be interpreted to include such flights ordered by the Commanding Officer which he considers necessary for the Air Service, such as,

Securing material urgently needed from another Post.

Transporting military passengers on urgent military duty, etc.

(2) *Authorized Patrol Flights* will include Forest, Border, Sea-coast or Long Distance Reconnaissance (Photographic or Visual) patrols.

3. Projects for cross-country flights submitted to this office under the preceding paragraph, will not be approved unless at the point of origin there has been received definite knowledge as to the size and availability of the field for landing purposes and unless satisfactory arrangements have been made with local officials for the proper policing of all landing fields, which it is contemplated to utilize in connection with the flight in question. Such arrangements will not be reported as satisfactory unless written or telegraphic assurances have been received and are on file in the office originating the project.

RESPONSIBILITY

4. Commanding Officers of Air Service Stations from which cross-country flights originate, will see that all officers engaging are provided with a copy of this order and that the pilot or the flight commander, if there be more than one airplane, also has copies of Stencil W-143, A.S.(Revised).

5. The Senior Air Service Officer present on any flight, unless otherwise directed by the Commanding Officer, will be Flight Commander and will be directly responsible that the personnel and material engaging in the flight is properly equipped, that the flight is conducted in accordance with all orders and regulations generally and specifically applicable to flight in question, and in case of accident will act as Accident Investigation Officer.

6. Individual pilots must realize their responsibility toward others and except in the case of forced landings, *must not attempt to land* in small fields where poor pilotage or sudden failure of motor might be the cause of death or injury to spectators. *Too much emphasis cannot be placed on this point.*

7. Low flying over cities or other thickly populated districts is forbidden, except where altitude is more than sufficient to insure gliding distance to a policed and safe landing field. No pilot in any aircraft shall:

> Carry out any trick or exhibition flying over any city or town area or populous district or over any regatta, race meeting, or meeting for public games or sports, except where especially arranged for in writing by the promoters of such regatta or meeting and specifically authorized by the Director of Air Service.

8. RIGHTS OF WAY AND EXTRACTS FROM GENERAL INTERNATIONAL RULES OF THE AIR, APPLICABLE TO MILITARY PILOTS.

(THESE RULES WILL BE OBEYED RIGIDLY)

No pilots shall fly closer than two hundred (200) yards to any dirigible, free or captive balloon. Lightier-than-air craft will, at all times, have the right of way over heavier-than-air craft.

EXTRACTS FROM GENERAL RULES OF THE AIR

(19) Flying machines shall always give way to balloons, fixed or free, and to airships.

(21) A motor-driven aircraft must always maneuver according to these rules as soon as it is apparent that, if it pursued its course, it would pass at a distance of less than two hundred (200) yards from any part of another aircraft.

Note.—This rule will not apply to military formation, combat or other instruction flying, but *does* apply to military aircraft operating in the vicinity of civilian aircraft and vice versa.

(22) When two motor-driven aircraft are meeting end on or nearly end on, each shall alter its course to right.

(23) When two motor-driven aircraft are on courses which cross, the aircraft which has the other on the right hand must not pass by diving. Every aircraft coming up with another aircraft from any direction more than 110° from ahead, *i.e.*,

in such a position with reference to the aircraft which it is overtaking that at night it would be unable to see either of that aircraft's sidelights, shall be deemed to be an overtaking craft; and no subsequent alteration of the bearing between the two aircraft shall make the overtaking aircraft a crossing aircraft within the meaning of these rules, or relieve it of the duty of keeping clear of the overtaken aircraft until it is finally past and clear.

(24) As by day the overtaking aircraft cannot always know with certainty whether it is forward or abaft this direction from the other aircraft, it should, if in doubt, assume that it is an overtaking aircraft and keep out of the way.

(25) Where by any of these rules one of the two aircraft is to keep out of the way, the other shall keep its course and speed. When in consequence of thick weather or other causes, such aircraft finds itself so close that collision cannot be avoided by the action of the giving way aircraft alone, it shall take such action as will best aid to avert collision.

(26) Every aircraft which is directed by these rules to keep out of the way of another aircraft shall, if the circumstances of the case admit, avoid crossing ahead of the other.

(27) In following an officially recognized aerial route, every aircraft, when it is safe and practicable, shall keep to the right side of such route.

(28) Aircraft on land or water about to ascend shall not attempt to "take off" until there is no risk of collision with alighting aircraft.

(30) In obeying and construing these rules due regard shall be had to all dangers of navigation and collision and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

(31) The dropping of ballast other than fine sand or water from aircraft in the air is prohibited.

9. After having made a landing, or after an accident at any place other than a Government station, the pilot will not leave his airplane until he has provided a military or responsible civilian guard to care for it, except to telephone or telegraph for assistance. Pilot's responsibility, after a crash, does not cease upon supplying a military or civilian guard. Unless specifically instructed to the contrary, by his Commanding Officer, he will not desert the airplane until it is turned over to:

(*a*) A crew sent out to receive it,
(*b*) Railway for shipment,
(*c*) An Air Service Officer authorized to accept the airplane.

When leaving an airplane out of doors at night or for any length of time, it must be staked down, preferably head to probable direction of wind, controls lashed and, if possible, the motor and propeller should be covered. The radiator of the airplane should be drained if there is any possibility of freezing.

10. A Flight Commander of cross-country flights will notify the proper officials of the probable time of arrival of his flight at the landing fields sufficiently in advance to permit proper policing of the field. If any change in the schedule is made which might affect these arrangements, due notice will be given by the Flight Commander to the local officials.

REPORTS

11. Commanding Officers will require individual pilots (where one plane only is involved) or flight commanders on cross-country flights (where more than one plane participates) to submit one report on the proper form (Stencil No. W-143, A.S. Revised) immediately upon the termination of flight in question.

12. It is essential that arrangements be made by individual pilots or Flight Commanders to secure data required by this report as the events occur, rather than depending upon their memories or the memories of others at some later time.

13. These reports will be disposed of as indicated on the form, *with the exception* that when the flight has been made over a well-known route, it will not be necessary to complete the form (Stencil No. W-143, A.S., Revised) but simply report thereon the time in the air, gasoline and oil consumption and any incidents peculiar to the flight in question, using Individual Pilot's Sheet, pages 1 and 2.

14. Specific instructions concerning any publicity or technical reports required will be issued when necessary in connection with each cross-country flight authorized under Paragraph 1, this order.

15. Immediately upon arrival at destination, or upon the completion of each day's travel, pilots will report by wire to their home station, stating probable time of leaving for next objective.

ACCIDENTS

DAMAGE TO PERSONS OR PROPERTY

16. *Death or Injury.*—In case of airplane accidents resulting in death or injury to private individuals or a person in the airplane, a telegraphic report will be submitted at once to the Commanding Officer of the home station, giving full particulars.

17. *Damage to Airplane.*—In case of accident where the airplane only is damaged, the following will be telephoned or telegraphed at once to the airdrome of the machine:

(*a*) The exact location,
(*b*) Extent of damage,
(*c*) Probable length of time required for repairs,
(*d*) Whether or not repairs can be made on the field.
(*e*) Spare parts required.

In case of the inability of the pilot to make report, the first Air Service Officer on the scene of the accident will take complete charge and make the necessary reports.

18. *Injury to Persons.*—In case of accident to private individuals as a result of an airplane accident, pilot will mail to the Commanding Officer at the home station the following information:

(*a*) Date and place of accident,
(*b*) Name, address, sex and approximate age of person injured,
(*c*) Cause, and circumstances attached thereto,
(*d*) If possible, the nature and extent of injury, accompanied by a physician's statement,
(*e*) Name and address of at least two witnesses to the accident or injury.

19. *Property Damage.*—In case of damage to private property caused by an airplane, detailed report will be mailed, at the earliest moment, to the Commanding Officer of the station from which the flight originated, giving:

(*a*) Name and postoffice address of the owner of property,
(*b*) Pilot's estimate as to the extent and nature of damage done,

(*c*) Pilot's estimate of the value and kind of property damaged,
(*d*) Names and addresses of at least two witnesses to the accident or to the damage.

Note.—These reports must be accurate and comprehensive, as they will usually furnish the only information available upon which a board of officers may act.

Important.—Pilots will, if possible:

(*a*) Secure from the owner of the damaged property a signed estimate of the value of the property damaged. This should be done whether or not the owner at that time intends to press a claim for damages.
(*b*) When a forced landing has been made near or among growing crops, at once inform the owner thereof that the government will only recognize just claims for damage caused by airplane, its crew or by efforts to move same but cannot be responsible for damage caused by visitors to the scene trampling, or otherwise destroying crops, fences or other property.

EQUIPMENT

20. The personnel and airplanes engaged in cross-country flights will be provided with usual equipment of first aid, spare parts, tools, forms for reports, Government Bills of Lading and transportation requests, good aerial maps, reliable compasses, and any special equipment as determined by the object of the flight, facilities at hand and special instructions received. Non-magnetic control sticks should be used whenever possible, and must be used where a compass flight is contemplated. Emergency rations and a canteen of water per person will be carried on *all* Border and Forest Patrols and on *all* cross-country flights where a forced landing will subject the crew to the chance of landing where food or water is unobtainable.

EXPENSES—PURCHASES

Note.—Any Air Service Officer placed in the position of collecting money from or spending money of the Government for the purchase of oil, gasoline, spares, labor or otherwise, *must be* familiar with the complete procedure thereof.

21. Officers ordered to make cross-country flights will take the following steps to secure their reimbursement when the order directing flights is issued by The Adjutant General of the Army and specifically allows reimbursement not to exceed $8.00 per day:

(*a*) Itemize their expense account,
(*b*) Support each item with proper voucher,
(*c*) Certify correctness of items and total,
(*d*) Attach to account a true copy of order directing flight,
(*e*) Submit same to Finance Officer, who pays troops, for payment from Air Service funds, together with the order directing the flight and authorizing not to exceed $8.00 per diem expenses.

In no case will Commanding Officers authorize airplane flights calling for reimbursement to the pilot of $8.00 per day, authorized by Paragraph 1280½, added by C.A.R. No. 91, for airplane travel. In no case where flights have been authorized by Commanding Officers, will claims for reimbursement of $8.00 per day be confirmed in this office.

22. It is extremely important that all expenses connected with cross-country flying be promptly met. The credit of the Air Service has already suffered severely by the fact that bills incurred by aviators on cross-country flights have been allowed to drag on indefinitely before being paid. In case of an extended cross-country flight, and the Field or Unit Commander or higher authority deems it necessary, a Supply Officer will be appointed for the flight, who will be allotted funds and who will account for all property as required in existing War Department Instructions. In this case, paragraphs 21 and 22 are modified to meet the circumstances.

23. Gasoline and oil for the Air Service are procured by the Quartermaster General, Director of Purchase & Storage, from appropriations under his control. (The ordinary method of procurement is prescribed in P. & S. Notice No. 110, dated March 25, 1919. P. & S. Notice No. 240, dated Sept. 25, 1919, prescribes a method to enable aviators to make emergency purchases and for the prompt payment therefor.) Pilots purchasing oil and gasoline will:

(*a*) Obtain bills in triplicate from the vendor.
(*b*) Execute a certificate in triplicate covering the circumstances which made the purchase necessary, the fact that the supplies were duly received in good condition in the quantity and quality ordered, and were expended in the public service, giving also the U. S. number of the ship, and authority for the flight.
(*c*) Promptly transmit the bills and certificates to the Supply Officer of the Field to which his ship belongs. The Supply Officer of the Field to which the ship belongs (in certain cases another Supply Officer may be designated) will take up and account for the supplies in the manner prescribed for purchases by the Purchase & Storage Division and certify the bills to the local Finance Officer, who is authorized to make payment under the general authority contained in P. & S. Notice No. 240, 1919. The cost of transportation of oil and gasoline should be merged in the price of supplies. All bills for oil and gasoline, and certificates covering the bills, *must be* made separate from bills and certificates for spares and services.

24. The purchase of necessary small parts for the repair of aircraft and the procurement of necessary services in connection with the repair of same, arising from emergencies encountered in authorized cross-country trips, is authorized from Air Service funds. Pilots procuring such supplies or services will secure bills in triplicate and will execute a certificate as covered in paragraph 21. He will promptly transmit the bills and certificates to the Supply Officer of the field or unit to which the ship belongs, who will take up and account for the property purchased and will certify the bills to the local Finance Officer who is authorized to make payment therefor from his allotment covering item No. 721 of Air Service funds. In case his allotment covering item No. 721 is insufficient, he will make prompt application to this office for increase.

25. *Guards or Watchmen.*—In authorized cross-country flights when emergencies make it necessary to stay out over night, guards for the ships may be hired when the flight consists of one or two planes at the local rate for such services, but not to exceed Five Dollars ($5.00) per night for each

necessary guard. If there are more than two planes in the flight, the guards will be composed of members of the crews (provided that the ships have enlisted crews) under the direction of the Commanding Officer of the flight. The aviator hiring these guards will procure bills in triplicate and render the certificates, as in paragraph 21, to the local Finance Officer, who is authorized to pay the same from his allotment covering item No. 721 of Air Service funds. If his allotment is insufficient, he will make prompt request to this office for an increase.

SHIPPING WRECKED AIRPLANES

26. Under authority of Transportation Bulletin No. 100, dated November 11, 1919, each aviator before starting on a cross-country flight will secure from the local Transportation Officer, on memorandum receipt, a Government Bill of Lading and a Transportation Request, filled in blank as far as possible by the Transportation Officer, for use in case of wreck. The Government Bill of Lading will be used only for shipping wrecked aircraft. In case the Transportation Request is used for emergency travel, proper confirmatory orders to cover the travel must be promptly obtained. The person to whom Bills of Lading or Transportation Requests are issued are held responsible therefor. Unused Bills of Lading or Transportation Requests will be returned to Transportation Officer for cancellation. (Always request automobile carrying freight cars which open at the end, and see that these cars are sealed. If impossible to procure those then flat cars are used, pilots should remove all instruments and return them to home station of airplane, personally, if possible.)

FLYING AND LANDING AFTER DARK

27. No night cross-country flights will be undertaken except for specific training in night flying or experimentation authorized by the Commanding Officer, or by night flying units and where suitable facilities exist for night landing. Except in pursuance of the above, every effort will be taken to eliminate flights which will require landing after dark. No pilot will attempt to reach another field unless he can be reasonably sure of arriving before sunset.

28. Commanding Officers of Fields where flood lights are available for night landing of airplanes will be held responsible that their men are instructed how to use the lights when in commission. In case lights are not in commission or unavailable, all Air Service men should be taught the use of flares and certain men, either Chief of Emergency Crew or non-commissioned officer of the Guard, be held responsible for their display for pilots desiring to land at night.

29. This method should be used universally in the United States in order that it might be recognized at once by any pilot wishing to land after dark. Six or seven buckets containing waste, soaked in gasoline, should be placed on the field near the best landing, in the shape of an "L," as indicated below:

Best landing
Wind is from * here Approach
this direction * from here
* * * * *

(*Note:* Stars represent flares.)

PAPERS NECESSARY ON CROSS-COUNTRY FLIGHTS

30. Papers necessary for pilots on cross-country flights authorized by The Adjutant General's Office consist of:

Copy of this order

Copy of Form W-143, A.S., (Revised) Cross-Country Flight Report and Landing Field Report sheet same as Questionnaire on page 13 of this Guide.
Copy of Form 330-A (Public Voucher)
Copy of Form 335 (Pay Voucher for Personal Services)
Government Telegraph Blanks.

By direction of the Director of Air Service:

WM. F. PEARSON,
Colonel, A.S.A.,

Administrative Executive.
V-1644, A.S.

CERTIFICATES FOR PILOTS OF FLYING MACHINES

International Requirements for Air Navigation

(A) Private Pilot's Flying Certificate
(not valid for purposes of public transport).

1. *Practical Tests:*

In each practical test the candidate must be alone in the flying machine.

(*a*) *Test for Altitude and Gliding Flight.* A flight without landing during which the pilot shall remain for at least an hour at a minimum altitude of 2,000 meters above the point of departure. The descent shall finish with a glide, the engines cut off at 1,500 meters above the landing ground. The landing shall be made without restarting the engine and within 150 meters or less of a point fixed beforehand by the official examiners of the test.

(*b*) *Tests of Skill.* A flight without landing around two posts (or buoys) situated 500 meters apart making a series of five figure-of-eight turns, each turn reaching one of the two posts (or buoys). This flight shall be made at an altitude of not more than 200 meters above the ground (or water) without touching the ground (or water). The landing shall be effected by:

(i) Finally shutting off the engine or engines at least when the aircraft touches the ground (or water).

(ii) Finally stopping the flying machine within a distance of 50 meters from a point fixed by the candidate before starting.

2. *Special Requirements*:

Knowledge of rules as to Lights and Signals, and Rules of the Air. Rules for Air Traffic on and in the Vicinity of Aerodromes. A practical knowledge of international air legislation.

(B) Pilot's Certificate for Flying Machines for Purposes of Public Transport.

1. *Practical Tests:*

In each practical test the candidate must be alone in the flying machine.

(*a*) The tests for altitude and gliding flight and for skill are the same as those required for a private pilot's flying certificate. Candidates already in possession of the latter certificate are not required to pass these tests again.

(*b*) Test of endurance consisting of a cross-country or oversea flight of at least 300 kilometers, after which the final landing shall be made at the point of departure. This flight shall be made in the same flying machine within eight hours. It shall include two obligatory landings (during which the machine must come to rest), which shall not be at the point of departure, but which shall be fixed by the judges.

At the time of departure the candidate shall be informed of his course and furnished with the appropriate map. The judges will decide whether the course has been correctly followed.

(*c*) *Night Flight.* A thirty minutes' flight made between two hours after sunset and two hours before sunrise, at a height of at least 500 meters.

2. *Technical Examination.*

After satisfactory practical tests have been passed, candidates will, when summoned, submit themselves to examination on—

(*a*) *Flying Machines:*

Theoretical knowledge of the resistance of the air as concerns its effects on wings and tail planes, rudders, elevators, and propellers; functions of the different parts of the machine and of their controls.

Assembling of flying machines and their different parts.

Practical tests on riggings.

(*b*) *Engines:*

General knowledge of internal combustion engines, including functions of the various parts; a general knowledge of the construction, assembling, adjustment, and characteristics of aero-engines.

Causes of the faulty running of engines and of breakdown.

Practical tests in running repairs.

(*c*) *Special Requirements.*

Knowledge of Rules as to Lights and Signals and Rules of the Air, and Rules for Air Traffic on and in the Vicinity of Airdrome.

Practical knowledge of the special conditions of air traffic and of international air legislation.

Map reading, orientation, location of position, elementary meteorology.

The practical tests shall be carried out within a maximum period of one month.

They may be carried out in any order, and each may be attempted twice. They shall be witnessed by properly accredited examiners, who will forward the official reports to the proper authorities.

The official reports will give the different incidents, especially those of landings. The candidates shall furnish before each test proper identity forms.

A barograph shall be carried on all practical tests, and the graph, signed by the examiners, shall be attached to their report.

Pilots who hold the military pilot's certificate shall be entitled to the private pilot's flying certificate, but, in order to obtain the pilot's flying certiffcate for purposes of Public Transport it will be necessary to pass the technical conditions for navigation as required by B (2) (*c*).

INTERNATIONAL MEDICAL CERTIFICATES

1. Every candidate before obtaining a license as a pilot, navigator or engineer of aircraft engaged in public transport will present himself for examination by specially qualified medical men (flight surgeons), appointed by or acting under the authority of the contracting State.

2. Medical supervision, both for the selection and the maintenance of efficiency, shall be based upon the following requirements of mental and physical fitness:

(a) Good family and personal history, with particular reference to nervous stability. Absence of any mental, moral or physical defect which will interfere with flying efficiency.

(b) The minimum age for pilots and navigators engaged in public transport shall be nineteen (19) years.

(c) *General Surgical Examination.* The aeronaut must neither suffer from any wound, injury or operation nor possess any abnormality, congenital or otherwise, which will interfere with the efficient and safe handling of aircraft.

(d) *General Medical Examination.* The aeronaut must not suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of aircraft. He must possess heart, lungs, kidneys and nervous system capable of withstanding the effects of altitude and also the effects of prolonged flight.

(e) *Eye Examination.* The aeronaut must possess a degree of visual acuity compatible with the efficient performance of his duties. No pilot or navigator shall have more than two (2) dioptres of latent hypermetropia; muscle balance must be good and commensurate with the refraction. He must have a good field of vision in each eye and must possess normal color perception.

(f) *Ear Examination.* The middle ear must be healthy. The aeronaut must possess a degree of auditory acuity compatible with the efficient performance of his duties.

(g) The vestibular mechanism must be intact and neither unduly hypersensitive or hyposensitive.

(h) *Nose and Throat Examination.* The aeronaut must possess free nasal air entry on either side and not suffer from serious acute or chronic affections of the upper respiratory tract.

3. Each contracting State shall for the present fix its own methods of examination until the detail of tests and the minimal standard of requirements have been finally settled by the authorized medical representatives of the International Commission for Air Navigation.

4. The successful candidate will receive a medical certificate of acceptance, which must be produced before the license can be issued.

5. In order to insure the maintenance of efficiency, every aeronaut shall be re-examined periodically, at least every six months, and the findings shall be attached to his original record. In case of illness or accident also, an aerounaut shall be re-examined and pronounced fit before resuming air duties. The date and result of each re-examination shall be recorded on the aeronaut's flying certificate.

6. No aeronaut who, before the date of the present Convention, has given proof of his flying ability, shall, so long as he retains such ability be necessarily disqualified because he fails to fulfil all of the above requirements.

7. Each contracting State may raise the conditions set forth above, as it deems fit, but these minimal requirements shall be maintained internationally.

TROUBLE SHOOTING IN AIRPLANE ENGINES

COMPLETE INSTRUCTIONS FOR THE CARE OF MOTORS ISSUED BY THE DIRECTOR OF AIR SERVICE

Preliminary knowledge.—To be able to shoot trouble successfully and systematically it is necessary to know—

(*a*) The general design of the motor, the magneto, and the carburetor.
(*b*) The direction of rotation and firing order.
(*c*) What the motor is supposed to perform—the highest r.p.m.; lowest r.p.m.; the oil pressure; correct running temperature; pick-up.
(*d*) Degree of vibration at various speeds.
(*e*) The valve clearance.
(*f*) The correct spacing of the spark plug electrodes.
(*g*) The correct spacing of the magneto contacts.
(*h*) The approximate size of carburetor jets.
(*i*) The air pressure used to force the gasoline.
(*j*) The "feel" of the compression by turning the propeller.

Knowledge of symptoms required.—One who is not entirely familiar with engine construction will very rarely locate the troubles by haphazard experimenting. It is only by knowing the symptoms, the cause of the symptom, and by systematically eliminating the causes or probable causes until the trouble is corrected that success is obtained when trouble shooting.

Local and general troubles.—There are two kinds of trouble —(*a*) local, (*b*) general. Local trouble is when the trouble is confined to one or two cylinders or it may be confined to one block of Vee-type engine. A dirty spark plug, for example, is a local trouble. It will cause one cylinder to miss, but can not affect the other cylinders. General trouble is when the trouble intermittently "skips" from one cylinder to another or affects all the cylinders, causing missing or a complete shutdown. A leaky intake manifold, for example, is a general trouble. It will cause all cylinders to miss, and if real bad can prevent starting.

Sources of trouble.—There are three main sources of trouble:

(*a*) Carburetion.
(*b*) Ignition.
(*c*) Compression.

Other troubles might be called subtroubles. Example: An exhaust valve not seating is a local subtrouble of the main trouble, *compression.* Dirty contacts might be called a general subtrouble of the main trouble, *ignition,* because it is an ignition trouble and causes a general miss of the motor.

A symptom.—The symptom of the trouble is the effect the trouble causes or the condition of the motor caused by the trouble.

Main and subtroubles.—The first thing to be determined when trouble shooting is: What *main trouble* does the symptom indicate? Then: What *subtroubles* could cause the main trouble?

Order of classification.—We will now classify the main troubles under "*Carburetion, ignition,* and *compression,*" and endeavor to show the subtroubles and give the method determining the trouble, the systematic elimination, and remedy.

CARBURETOR SECTION

When general and subtroubles.—Troubles of the carburetor are usually classed as general troubles, but on the Vee-type motor, where twin carburetors are used, they may be classed as local troubles when one block is affected.

Usual symptoms.—The usual symptoms of carburetion trouble are a lean or rich mixture. When the mixture is lean, backfiring may be noticed in the carburetor and the motor will be found to fail to turn up to the proper r.p.m. When the mixture is distinctively rich a rolling, irregularly running motor, exhausting black smoke which has an offensive odor is the result.

Indications of a lean mixture.—To determine if the mixture is lean, close the choke valve partly. Notice speed of the motor if the speed increases. If it does, it is a positive sign that insufficient gasoline is being supplied the motor. Most mechanics at this stage would change the carburetor jets. In doing so, the motor would have to be restarted and tested again. To save the time of starting the motor several times, start systematically and trace the gasoline from the tank to the jets in the following manner:

(*a*) How much gasoline is in the tank?
(*b*) If pressure is used, what is the pressure?
(*c*) If no pressure is used, is the air vent open in the tank?
(*d*) Is the gasoline line or the filter stopped?
(*e*) Is the float level high enough?
(*f*) Any water in the carburetor or the system?
(*g*) Is the pressure from the float chamber to the jets stopped?
(*h*) Are the jets stopped?
(*i*) Any air leaks in intake manifold or its connections? If after trying all the above subtroubles of the main carburetion trouble and a remedy is not found, then it is permissible to increase the size of the jets, which will undoubtedly cure the trouble.

Indications of a rich mixture.—To determine if the mixture is rich, open the altitude adjustment slightly or hold the needle valve down tight. Notice the motor speed; if the speed increases black smoke decreases and the motor runs regularly, then the mixture must be rich. Since we have too much gasoline, the supply from the tank to the jets must be sufficient, but if the pressure were too great it would cause the carburetor to flood and we know flooding will cause a rich mixture by causing too much gasoline to overflow the proper jet level.

Tracing too rich a mixture.—Use the following system to trace the cause of rich mixture:

(*a*) Is the pressure too great?
(*b*) Is the float valve seating properly?
(*c*) Is the float air-tight?
(*d*) Are the jet gaskets the proper thickness and in good condition?
(*e*) Any other reason for flood, such as poor casting?

Note.—All the above subtroubles would cause flooding and in turn a rich mixture noticeable mostly at low motor speeds.

If no flooding is noticed try—
(*f*) Is the main air passage stopped?
(*g*) Is the choke valve partly closed?

Note.—After eliminating all the above subtroubles and still no cure is found, then decrease the size of the jets and trouble will be remedied.

Apply only usual process in case of lean mixture.—If after trying the method described for a lean mixture (see par. 10) and no speed increase is noticed, do not attempt any elimination of carburetor troubles, because of the other troubles that give the same symptoms, but do not respond to the same method of determination given. Example: An air leak in the intake manifold or its connections will cause trouble by diluting the mixture in the manifold, especially at low motor speed, when the vacuum in the manifold is the greatest and also because a lesser quantity of mixture is flowing through the manifold.

A symptom similar to a lean mixture.—Crossed magneto distributor wires will at times give a lean-mixture symptom, but is recognized by the motor missing locally on two or more cylinders, and should the spark occur while the intake valve is open will give a sharp backfire in the carburetor.

Inlet valves holding open.—An intake valve could cause trouble similar to a lean mixture by sticking in its guide or by not closing properly, causing also a dilution of the mixture in the manifold and in turn a general miss.

Improper exhaust valve timing.—An exhaust valve not opening properly would cause a back pressure when the intake valve opened and possibly cause back-firing at high speeds. It will give a lean-mixture indication, but will not respond to method previously stated to determine when the mixture is lean.

Preignition.—Preignition caused by carbon or a mistimed spark will sometimes cause back-firing by igniting the mixture when the intake is open.

General mistiming of valve.—The cam shaft set too early will cause back-firing. If the exhaust valve closes and the intake opens before the piston has reached top center and before the burning gases are exhausted, then the mixture in the manifold will ignite and back-fire.

Improper compression.—Poor compression in one or more cylinders will give a lean-mixture symptom, especially at low motor speeds, but can not be remedied by the lean-mixture test.

Over oiling.—Too much oil in cylinders will give a similar symptom to that of a rich mixture, making the motor roll, run irregularly and emit a volume of blue smoke, especially after the motor has been throttled down some time. The burning oil will saturate the mixture. Speed the motor and then throttle down gradually. If the motor continues to miss when throttled slowly, it may be a combination of both a rich mixture and too much oil, in which case test for rich mixture and decrease oil pressure. If the motor runs for some time when slowed down without missing, that indicates the mixture is good until saturated with oil, in which case decrease the oil pressure.

Low volatility of gasoline.—Poor grade of gasoline will make motor hard to start, overheat motor, and possibly cause back-firing at high motor speeds; also throttle very poorly. If motor must be started and better gasoline is not available saturate a clean rag with gasoline so the gas will not drip from rag and place the rag in the main air intake of the carburetor; open the throttle about a third way. Then start motor and withdraw the rag when motor runs fast enough to carry on. This method will allow the lighter gases to be drawn from the rag and usually works very well. The reason poor gasoline makes the motor heat and back-fire is because it is slow burning. It continues to burn when intake valve is open and ignites the incoming charge of gas.

Occurrence of water.—Water in gasoline is a common occurrence. It will, if enough, make the motor impossible to start. When the motor is running it will cause back-firing at high speed and cause stopping or missing when motor is throttled. Water is heavier than gasoline and can not be drawn through the jets by same vacuum as gasoline. If only a small quantity, it can sometimes be removed by speeding the motor and clogging the choke when motor is at speed. This will create a higher vacuum on jets and draw the water through. Before the motor stops open choke and respeed to clean out rich mixture. This should never be done if motor is real cold, as the unburned gasoline due to the clogging on the choke will collect in the cylinders, destroy the lubrication of the cylinder walls and possibly cause scoring. It will also work past the rings and dilute the cylinder oil. Don't rest until all the water is removed from the gasoline supply system.

Air leaks in manifold or its connections.—The leaks commonly occur at the joints and are caused by faulty gaskets, by neglect to place gaskets, or by faulty machining of the manifold flanges preventing their being drawn tightly together all around the passage. The best gasket is a soft, compressible, and tough material. Rubber or asbestos gaskets should not be used as the gasoline will deteriorate them and cause leaking. Gaskets should never be more than $\frac{1}{16}$ inch thick. Thicker gaskets may cause the flanges to become sprung and cause a leak.

Worn intake valve stems and guides.—These commonly occur in older engines and affect the mixture at low motor speeds, causing missing and stalling.

Importance of air leaks.—Too much importance can not be attached to air leaks, as a seemingly insignificant leak will cause serious difficulty in starting the engine and make it very sensitive to stalling. Should an engine stall while being flown close to the ground it may place the aviator's life in danger and cause a serious accident.

Carburetor changes.—It is essential to go over the entire engine before attempting any carburetor change, unless, of course, the action is such as to point directly to the carburetor.

Gasoline economy.—Economy of gasoline is very important in airplanes due to the limited carrying capacity. A gallon of gasoline may save the lives of the men flying. Therefore, it is important to keep the mixture as lean as possible and still obtain the motor's maximum r.p.m.

Changing choke and jets.—The following rules for changing the choke tube or jets are recommended:

Choke tube too large: The pickup will be defective and can not be bettered by use of a large compensator. The motor will have a tendency to load up and at high speed run irregularly.

Choke tube too small: The effect of a small choke tube is to prevent the motor from taking a full charge when the throttle is open fully and motor will not develop its proper r.p.m.

Main jet too large: Irregular running, characteristic smell from exhaust, carbon, sooting of spark plugs, and excessive consumption of gasoline.

Main jet too small: Lean mixture at high speed, backfiring and low r.p.m.

Compensator too large: Same indication as large main jet, except it shows up at lower motor speed.

Compensator too small: Poor pickup, lean mixture at moderate speed, motor misses and tries to stall at half-throttle opening.

Ability for prompt adjustment.—Don't play with carburetor a long time. Carburetor trouble should first be determined and then adjusted. The adjustment should never take longer than it is necessary to take out the old jets and replace new ones.

Classification.—Ignition trouble is classified as either general or local trouble.

Determination.—To find ignition trouble, first determine what class the trouble is.

Occurrence of local trouble.—Local trouble is usually confined to one cylinder, although it may occur on two.

Local-trouble test.—After classifying the trouble, if it is local trouble on the cylinder, take high-tension lead from spark plug, hold within $\frac{1}{8}$ inch of the cylinder, observe the spark. (Test made with engine running.) If the spark jumps the gap, then stop the motor, take the spark plug from the missing cylinder and change with the plug from another cylinder which did operate well, put the plug taken from the missing cylinder in place of the other plug. Start motor and retest. If the miss changes to the cylinder where the plug was placed from the first missing cylinder, then the trouble is the spark plug. If the same cylinder continues to miss after the plugs are changed, then the miss is not due to ignition trouble. Examine valves for clearance and compression.

The case of a shorted distributor block.—If when the wire is held $\frac{1}{8}$ inch from the ground and no spark or a very weak spark is observed, then disconnect the same high-tension wire at the magneto and see if magneto is delivering a spark to that wire. If it is, the lead wire is shorted. If it is not, and all other cylinders are receiving their proper sparks, then the trouble must be a shorted distributor block. This may be due to oil on the face of the block and to an internal short circuit. Clean the block and try. If still bad, try a new block.

Local incorrect wiring.—When trouble is a two-cylinder local miss, it may be due to dirty spark plugs, shorted wires, shorted distributor block, but is most commonly due to the wires being attached incorrectly.

Spark plugs.—Spark plugs can give local misses only, but are sometimes very difficult to locate when missing only once in a great while. If the electrodes are set too far apart the motor will be hard to start and will miss at high speeds. If too close, will start easily, but will throttle very poorly. A setting of 0.018 to 0.025 is about correct for airplane motors. If the magneto is weak, they may be set as low as 0.010, but the magneto should be repaired or replaced as soon as possible. If the motor has a tendency to oil the spark plugs, a close setting will be found to keep plugs clean longer.

Removing porcelains.—Cracked porcelains are mostly due to carelessness of the mechanic. When taking plugs apart the body of the plug should be held in a vise just tight enough to keep it in place. Get a wrench that fits the porcelain binding nut, a socket if possible, and be sure the wrench doesn't slip.

When cleaning the porcelains, never use emery cloth or sandpaper, as they will scratch off the gloss, roughen the surface, and make the porcelain more susceptible to carbon. When putting plug together a new inside gasket should be used. Tighten the binding nut carefully, tight enough to prevent leaks, but not so tight that the heat of the motor will expand the porcelain and break it. The reason a new gasket should be used is that it will prevent leakage without being tightened as tight as an old one and allow more room for expansion. A new outside gasket should also be used for the same reason. Nothing will cause a plug to go bad quicker than a leak around the porcelain, as the hot gases will overheat it and crack it.

Cleaning plugs.—Plugs should be kept clean of carbon. It is impossible to keep the plugs very cool with water circulation, and a small particle of carbon may become incandescent and preignite the mixture. It is more difficult to clean spark plugs that do not come apart. To get good results soak the plugs in kerosene, then scrape off carbon and wipe dry.

Setting electrodes.—Care should be taken not to bend the electrodes unless necessary to adjust. They become brittle with age and break very easily. They should be scraped and examined very closely for defects of crystallization and if burned badly should be discarded. Porcelains should be examined thoroughly and replaced if they show any signs of being cracked.

General trouble.—General ignition trouble may cause any cylinder to miss or cause failure of motor to start.

Magneto case.—When a high-tension magneto is used the following trouble-shooting system has been used successfully in finding general ignition trouble:

High-tension magneto system.—Disconnect all spark-plug wires. Hold one or more within ⅛ inch of the cylinders. Have another man crank the motor over quickly as if to start it. Notice size and color of spark. If spark jumps the gap and seems "fat," that is, if it has plenty of volume and appears to flame, the ignition system is no doubt all right as far as general trouble is concerned. If the spark appears "thin," only a faint blue spark without any volume or if no spark appears, then the magneto is at fault.

The next test should be made off the collector ring or from the lead from the high-tension winding before the current is led to the distributor. Take a piece of high-tension wire, fasten one end to the engine so it will ground, hold the other end about ⅛ inch from the collector ring or high-tension winding lead and have another man crank the motor.

To make proper test motor should be warmed, otherwise cold cylinder oil will give a false impression.

Warm motor before testing.—To test all cylinders warm the motor, make sure the motor is safe—it is best to disconnect all spark plugs—and turn the propeller in direction of rotation, noticing the resistance offered by each cylinder as it compresses. All cylinders should cause equal resistance.

Further inspection though good compression.—If all cylinders have an equal amount of compression and the resistance noticed is correct for the type of engine worked on, further inspection is still necessary. An exhaust valve so gummed or carbonized as to close slowly when motor is running is a cause of trouble, sometimes not found when turning the propeller by hand. It is usually noticed by a popping sound in the exhaust. If no popping sound is noticed, the "feel" when cranking is good and the motor throttles equally on all cylinders—then compression may be considered good.

When to examine timing.—If "feel" when turning propeller is poor on all cylinders examine timing and clearance of valves, and if not right, correct. If right, remove all spark plugs and insert a small quantity of cylinder oil in each cylinder, replace the plugs and try again for compression, if compression is improved. Remove a small quantity of oil from the sump for examination. If oil appears good then trouble may be due to too much gasoline in the cylinder from over priming. In each case the insertion of oil through the plug hole is all that is necessary. If the oil is black, feels gritty, and seems very thin, replace with fresh oil.

The case of piston rings and excessive oiling.—Poorly fitted or broken piston rings usually show up on one or several cylinders by pumping cylinder oil and are usually detected when turning the propeller. Piston rings can be fitted to hold compression and yet pump oil, so lack of compression can not be blamed on the rings when pumping oil unless the valves are known to be good. In case of broken rings or rings pumping excessive oil, the motor will have to be removed from plane and overhauled.

Excessive oiling of one cylinder may be due to several causes.

(*a*) If the rings fit the walls poorly.
(*b*) If the rings fit the piston grooves poorly.
(*c*) If the cylinder is scored.
(*d*) If valves are not seating properly.
(*e*) If connecting-rod bearing of that cylinder is very loose, or if the oil grooves very deep, excessive oil will be thrown up in the cylinder where pressure feed system is used. This is noticed on V motors when two cylinders opposite each other give the same symptom of over oiling.
(*f*) If valves are not operating properly.
(*g*) Poorly-fitted pistons. Pistons, when too loose, will allow too much oil on cylinder walls and this oil will force by the piston rings, giving the impression that the rings are bad. Poorly-fitted pistons usually give a rattling sound when motor is throttled or running at moderate speed. Over oiling usually results in poor compression by carbonizing the valves and causing them to seat improperly.

Carbonized valves.—Carbon on valves is the most common of compression troubles. It is due to over oiling, rich mixture, or to natural deposit from long service without cleaning. It is impossible to prevent this deposit, but it may be decreased by keeping the mixture as clean as possible, using good oil, changing oil often and an injection of kerosene in the combustion chamber while the engine is warm after each flight.

Warped or burned valves.—Warped valves are usually due to an excessive deposit of carbon on face of valve, poor material in valve, or the stopping of a motor while very hot. A motor should never be stopped immediately after running at full throttle, but should be throttled down until the motor cools gradually to its normal heat. Rapid cooling of a motor is just as harmful as rapid heating. Rapid cooling usually results in warped valves. Burned valves are the result of running a motor which has warped or carbonized valves. Burned and warped valves can also be the result of being poorly ground in. Should a slight leak be left the burning gases when on the power stroke will rush through the opening and in time make the opening much larger.

Slow-burning mixture.—A slow-burning mixture caused by poor grade gasoline, lean mixture, and rich mixture will cause valve trouble, overheating the motor and leaving carbon deposit.

Overheating.—Poor grade oil, rich mixture, lean mixture, late spark, new or tight motor, and lack of water or poor circulation usually give valve trouble first and ruin the complete motor in short time.

Weak valve springs.—Weak valve springs usually occur on the exhaust side from overheating. They are most noticeable at low motor speed. When on the intake stroke if the exhaust valve spring is weak the suction created by the downward plunge of the piston will cause the valve to open partly and a portion of burned gases will be drawn in from the exhaust manifold, causing a dilution of the mixture and a poor explosion. They can usually be detected by a popping sound in the exhaust manifold. If a screw driver is placed under the spring and more tension created the cylinder giving trouble can be located by the ceasing of the popping noise.

Defective cam shafts.—Defective cam shafts are very rare and very difficult to diagnose on account of the many symptoms they can create. Should one be suspected, check the timing of each cylinder separately.

Defective valve operating mechanism.—Defective valve operating mechanism, such as a defective cam follower, is rare and hard to locate. Usually shown up when it is impossible to get the proper valve timing. Tight rocker arm bearings will cause the valve to hold open too long and result in a general miss when an intake valve is affected and a local when an exhaust.

Conclusion.—We have now gone over a few of the most common troubles and explained their separate symptoms and causes, but in a great many cases when trouble shooting it will be found that several troubles will happen at the same time and perhaps a complicated symptom will be the result.

In such case it will mean that the trouble will be harder to diagnose and locate. Should a complication of trouble be suspected time will be saved by making a complete inspection of all units. Trace out ignition system, gasoline supply, compression, valve timing, etc. Eliminate troubles as found and when all are thought to be found, then start the motor. If proper inspection has been made the motor should, after a few slight adjustments, run perfectly.

ENGINE INSPECTION BEFORE FLIGHT

Airplane engines must be inspected before each flight in a systematic way, that takes little time, but covers everything thoroughly and efficiently. The inspector must keep in mind at all times that his inspection is not only to eliminate troubles that are found, but also to prevent troubles occurring. The old saying, "An ounce of prevention is worth a pound of cure" applies especially well to airplane inspection, and should be followed. The attitude of, "Oh, it's good enough," will not be accepted. The inspectors are more liable to court-martial than any man on the field. Carelessness can not be tolerated and will be sufficient cause for action against them. On the other hand, a good inspector is more popular than any man on the field and has better chance to show his worth.

The first requirement of an airplane mechanic is reliability—there must be no guess work about anything that is part of an airplane—everything must be right before the machine is permitted to leave the ground. If an airplane were to leave the ground and the motor fail over the enemy's lines, it may result in the death of the pilot and perhaps endanger a regiment or more of men who are dependent on the airplane for protection in case of a surprise attack.

Although the general principle of airplane engines is the same, each has its own peculiarities which must be memorized by the inspector. The inspector must know engines in general and as many different types as possible.

We will suppose we are assigned to inspect an engine for flight; it is to be ready as soon as possible. The plane is to go over the enemy's line to obtain information. The motor must not fail because the information gathered on the trip will mean the success of the drive. Our precedure will be as follows:

Before starting engine check as follows: Ignition system.—Trace ground wire from magneto to switch, examine it for shorts or places where it may be chafed or likely to chafe or short. Examine switch for proper action. Take off breaker box cover and watch operation of breaker as motor is turned over by hand. Clean points and reset if necessary. Be sure there is not too much oil in box; it should be dry except for a thin coating on the cam. Wipe out distributor block with clean cheesecloth that has a few drops of thin oil on it. If distributor segments are burned or blackened, rub off black with a lead pencil rubber.

Examine pencil for creaks and shorts. Examine pencil brush for proper contact; if burned or glossed, use fine sandpaper and sand off until gloss disappears and brush makes proper contact. Examine collector brush and sand down if necessary. If brush is worn short, replace it. All wires must be tight in their connections and the connections tight in distributor block and locked in place. Take out spark plugs, clean, examine for broken porcelains and set gaps. Set plugs aside until valves have been checked, as it is easier to turn the propeller without compression in cylinder.

Examine breaker box advance and retard mechanism (if used) for free and proper performance. Try for spark by holding several wires about $\frac{1}{8}$ inch from cylinder and spin propeller (plugs out). All connections must be tight and clean. All oil-soaked wires must be replaced. Wires must not chafe or be placed near exhaust ports or pipes. Wires must not be stretched so tight that the vibration of the motor breaks or pulls off the connection. See that none of the strands are broken where wire is attached to plugs. Go over timing and check for proper setting.

Compression system.—Check opening and closing of each valve and regulate clearance accordingly. See that valve mechanism is working properly. That the rocker arms and valves work freely. Make sure that tappet adjustments are securely locked. Test tension of valve springs, replace spark plugs and try compression by rotating propeller.

Gasoline system.—Examine tank setting and see that it is full. Examine tank for leaks. If gravity system is used check air vent. If pressure, see if tank holds pressure. Squirt a few drops of oil around tank filler cap and around pressure regulator and watch for leaks. Inspect gasoline line for leaks. Take plug from sediment trap and inspect for water and unusual amount of dirt. Replace plug. Disconnect gasoline line at carburetor and inspect flow of gasoline. Replace line, remove plugs under compensator jets, let gasoline flush through. Turn off gasoline, remove jets and check if proper size for motor. See that jet gaskets are O. K. Should any water be found in system, drain all gasoline and strain through chamois skin. Try out throttle controls for full opening and closing. Examine control wires for chafing. Turn on gasoline; watch for carburetor flooding.

Air system.—Inspect choker valve, see that it opens and closes correctly. Examine carburetor intake for stoppage. Sometimes a screen is used over the air intake and it will get clogged with dirt. Check all nuts on manifold joints and test for possible leaks with oil. Squirt oil around the joints, then turn propeller and watch for bubbles at the joints.

Water system.—Examine water for presence of oil. Fill radiator. Check all hose and pump connections for leaks. Examine condition of all hose. If oil soaked or soft, replace. When tire tape is used on hose it should be shellacked. See that all drain cock handles are turned down and tight. All airplanes carry just sufficient water and should a slight leak occur or be allowed to pass, it would only be a short time before the motor overheated.

Oil system.—Remove sump screen, clean and replace. Fill with required amount of fresh oil. Examine all oil pipes for leaks and make sure they can not vibrate and break loose. Examine crank case for leaks. Oil all moving parts with oil can.

General.—Check up propeller nuts and all lock springs and safety wires. See that propeller tracks within $\frac{1}{8}$ inch. Examine propeller for possible splitting or fraying. Go over all nuts and see that they are tight and properly locked, touching each with the fingers in order not to skip one.

After starting engine.—Run slowly until warmed, allowing all parts to expand equally and the oil to warm and circulate properly.

Speed up and adjust oil pressure to factory specifications.

See that water is circulating and motor doesn't heat.

Speed motor slowly noticing degree of vibration at various speeds.

Test motor at full speed and then at throttled speed.

If trouble appears and then disappears, don't rest until it is found and eradicated, for it may later appear especially at high altitudes.

Conduct entire inspection with aim of preventing trouble and don't quit until your concience is clear.

Classifying troubles.—When a motor is not working right we must classify the trouble or decide what the motor is doing. For example: "Does it miss," and "Cut out," "Slow down," "Backfire," "Fail to start," "Loud reporting at the exhaust," "No oil pressure," "Knock," or what? Then, at what speed does the trouble occur? Many troubles occur only at certain speeds, and therefore we should make note at what speed the trouble occurs.

General and local troubles.—Notice, if possible, what part of the motor is giving trouble, for example: On a V-type motor, is the right side or the left side missing? Notice *which* cylinder is giving trouble and we can then find the trouble comparatively quickly. Some troubles can cause the whole motor to go wrong, but could not cause just one cylinder to give trouble. Such troubles could be called "general" troubles. Another kind can cause one or two cylinders to miss or give trouble, but could not cause a general trouble these we call "local" troubles.

Elimination of troubles.—Suppose we say the motor is missing. Now, in addition to noticing at what speed the motor is missing, let us notice the nature of the miss. For instance, is one cylinder missing occasionally, one cylinder missing steadily, one side of the motor cutting out, or the whole motor cutting out as though we intermittently pulled the switch? Or, is it a scattering miss, which means first one cylinder on one side and then another cylinder elsewhere, but not missing regularly? Suppose we decide that we have one cylinder missing occasionally, "At what speed does the miss occur?" Suppose it occurs at low speed. What can cause a motor to miss only at low speed on one cylinder? Any of these causes will do it: Shorted spark plug, plug gap too close, poor compression, air leak around the intake valve stem or a weak exhaust valve spring. How are we to determine which of these troubles is causing the miss? Answer: By eliminating the most common cause until the trouble is found and remedied.

Diagnose the trouble by the symptom.—It is necessary when shooting trouble to properly diagnose the trouble by the symptom, and to eliminate troubles one at a time until the right one is found. It would be foolish to examine the magneto if the symptom indicated a lack of gasoline.

A list of symptoms and troubles.—The following paragraphs contain lists of symptoms with the troubles that will cause them. The student should acquaint himself with these symptoms, and in a short while should be able to diagnose troubles by the symptom and eliminate a particular trouble in a very short time.

IF ENGINE FAILS TO START.

It may be due to any of the following causes:

1. Lack of gasoline.
2. Primed too much. (Rotate engine backwards several times to clear it of excessive gas or turn engine in direction of rotation with throttle wide open.)
3. Insufficiently primed.
4. Throttle too wide open. (Or not enough.)
5. Faulty spark.
6. Lack of compression.
7. Cam shaft out of time.
8. Ignition out of time.
9. Cold motor.

IF ENGINE STOPS.

1. Lack of gasoline.
2. Faulty spark.
3. Overheated.

LEAN (OR RARE) MIXTURE.

1. Water in carburetor.
2. Dirt in jets.
3. Poor gasoline supply. (Dirt in line or not enough pressure.)
4. Level low in carburetor.
5. Back-firing.
6. Air leak.
7. Jets too small.
8. Altitude adjustment open too far.
9. Venturi tube too large.
10. Low-test gasoline.

SCATTERING MISS (one that jumps from one cylinder to another).

1. Lean mixture.
2. Rich mixture.
3. Faulty spark.
4. Water in carburetor.
5. Air leak in intake manifold.

6. Intake valve holding open.
7. Valve springs weak.

MOTOR WILL NOT DEVELOP PROPER SPEED, YET DOES NOT MISS FIRE.

1. Mixture slightly too lean.
2. Mixture slightly too rich.
3. Cam shaft set too late.
4. Ignition set too late.
5. Poor grade of oil (or oil too long in use).
6. Overheating.
7. Tight motor (one that has just been overhauled or is new).
8. Venturi tube too small.
9. Insufficient throttle opening.
10. Excessive carbon.
11. Poor grade of gasoline.
12. Valves not opening far enough, due to valve seating too far in cylinder.

MISSING FIRE AT HIGH SPEED ON ONE CYLINDER.

1. Shorted spark plug.
2. Shorted distributor wire.
3. Shorted distributor block.
4. Spark plug gap too wide.
5. Weak exhaust valve springs.
6. Poor compression.

MISSING AT LOW SPEED ON ONE CYLINDER.

1. Shorted spark plug.
2. Spark plug gap too close.
3. Poor compression.
4. Shorted plug wire.
5. Shorted distributor block.
6. Air leak around intake valve stem.
7. Weak exhaust valve spring.

CAUSES OF EXCESSIVE CARBON IN CYLINDERS.

1. Use of too much oil.
2. Bad piston rings.
3. Poor grade of cylinder oil.
4. Rich mixture.
5. Motor run long while without cleaning.
6. Poorly fitted pistons.

RESULT OF EXCESSIVE CARBON IN CYLINDERS.

1. Preignition.

2. Overheating.
3. Knocking due to carbon; in time will loosen bearings.
4. Motor won't develop speed.

BACKFIRING IN CARBURETOR.

1. Cold mixture.
2. Lean mixture.
3. Air leak in manifold or around intake valves.
4. Valve springs weak.
5. Distributor wires attached wrong.
6. Magneto timed wrong.
7. Exhaust valve not opening or not far enough.
8. Camshaft set too early.
9. Rich mixture.
10. Overheating.
11. Carbon.
12. Low test gasoline.
13. Venturi tube too large.
14. Intake valve sticking. (Gummed or tight in guide.)

HOW TO DETECT MIXTURE BY COLOR OF EXHAUST.

1. Long red and yellow flame indicates rich mixture.
2. Short irregular light-blue flame indicates a lean mixture.
3. Black smoke indicates mixture entirely too rich.
4. Blue smoke, too much oil being used.
5. Quick blue flame without yellow tip; correct mixture.

CAUSES OF RICH MIXTURE.

1. Carburetor flooding.
   - (*a*) Leaky float.
   - (*b*) Level too high.
   - (*c*) Gaskets under jets bad.
   - (*d*) Hole in carburetor casting.
   - (*e*) Float valve not seating; dirt under seat.
   - (*f*) Air pressure too high.
2. Jets too large.
3. Air intake stopped up. (Or choke valve closed part way.)
4. Venturi tube too small.

LOUD REPORTING OUT OF EXHAUST.

1. Preignition.
2. Cam shaft set too early.
3. Rich mixture
4. Spark too late.

5. New or stiff motor.
6. Faulty spark.

PREIGNITION.

1. Carbon.
2. Overheating.
3. Rich mixture.
4. Magneto out of time.
5. Wires from distributor crossed or lead to wrong cylinder.

FAULTY SPARK.

1. Breaker points not spaced properly.
2. Breaker points burned or corroded.
3. Condenser shorted or broken down.
4. Magnets weak or crossed.
5. Collector brush worn out or dirty.
6. Distributor brushes worn out or dirty.
7. Collector ring (or commutator) shorted or dirty.
8. Distributor block shorted or dirty.
9. Primary winding shorted or broken down.
10. Secondary winding shorted or broken down.
11. Distributor pencil shorted.
12. Safety gap too low.
13. Distributor out of time with primary circuit.
14. Poor connection between secondary and collector ring.
15. Ground wire or switch shorted.

OVERHEATING.

1. Spark set too late.
2. Poor water circulation.
3. Rich mixture.
4. Poor oil circulation.
5. Oil too thin or cold.
6. Lean mixture.
7. Cam shaft set too late.
8. Running at low speed too long.
9. Poor compression.
10. Tight bearings or pistons.
11. Bearings or pistons out of line.
12. Excessive carbon.

POOR COMPRESSION.

1. Valves not adjusted properly with respect to clearance.
2. Valves warped.
3. Valves caked with carbon.
4. Valve stems bent.

5. Valves gummed or sticking.
6. Leaky cylinder head, spark plug, or valve cage gaskets.
7. Insufficient oil supply or oil that has been used too long.
8. Rocker arms too tight.
9. Valve springs broken or weak.
10. Cam shaft out of time.
11. Rings not seating properly. (Or may be broken or weak.)
12. Cylinders scored.

RESULT OF RICH MIXTURE.

1. Excessive carbon formed in cylinders and on valves.
2. Overheating of motor.
3. Motor will gallop and not develop proper speed.

RESULT OF LEAN MIXTURE.

1. Motor will back-fire and may catch fire.
2. Will burn valves.
3. Motor will not develop proper speed.
4. Motor will stall or "die" easily.

RESULT OF TOO MUCH OIL.

1. Will cause engine to misfire by shorting spark-plugs.
2. Will create excessive carbon.
3. Will get on insulated wires and cause short circuits.
4. Will get on cloth-covered parts of plane and cause deterioration.
5. Will vaporize, and vapor will interfere with proper combustion, causing effect of too rich a mixture.

NO SPARK.

1. Primary circuit grounded.
2. Secondary circuit grounded.
3. Grounded ground wire.
4. Switch grounded.
5. Condenser open-circuited or shorted.
6. Magnets crossed.

WHEN THE ENGINE KNOCKS.

Knocks such as the following are caused by various defects in the engine:

Loose connecting-rod bearings.—A rather sharp metallic sound noticeable at low motor speed.

Loose main bearings.—A dull heavy knock accompanied by vibration. Noticeable when motor is picking up speed or when throttled down.

Loose wrist pins.—A sharp metallic sound. Very pronounced when motor is throttled down.

Loose pistons (*pistons slap*).—A "rattling" sort of sound, most pronounced when engine is running under light load.

Ignition advanced too far.—A very sharp knock without much volume of sound. May be stopped by retarding the spark.

Carbon.—A similar sound as spark knock, but can not be stopped by retarding the spark.

Labor knock.—Caused by engine running hot or by lean mixture.

OIL PRESSURE TOO HIGH.

1. Adjustment.
2. Bearings set too close.
3. Oil grooves in bearings not deep enough.
4. Oil pipe kinked or bent.
5. By-pass stuck closed.
6. Too much oil in system. (Liberty motor.)
7. Extra heavy oil.
8. Oil cold or frozen.

RAPID RISE IN OIL PRESSURE.

1. Bearings getting too tight due to overheating.
2. Stoppage in system between gauge and bearings.
3. Too much oil in system. (Liberty motor.)
4. Oil cold or frozen.

OIL PRESSURE TOO LOW.

1. Insufficient oil.
2. Regulator not set properly.
3. Oil too thin or cold.
4. Leak in feed pipes.
5. Bearings too loose.
6. Bad gauge.
7. Gears in pump worn.
8. Overheated motor.

RAPID DECREASE IN PRESSURE.

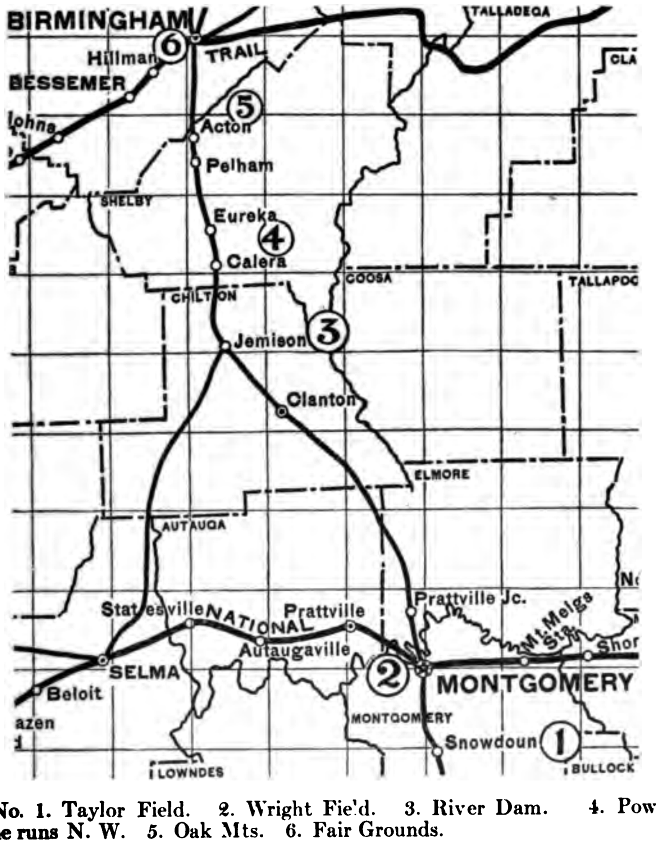
1. Leaky feed pipe or may be broken.
2. Stoppage in line between pump and gauge.
3. Broken pump gears or shaft.
4. Burned out bearing.
5. Running out of oil.
6. Overheating of motor.

AMERICA'S AVIATION FACILITIES

ALABAMA

CITIES	
ALBANY	Municipal field ¾ mi. S.E.—40 acres N. and S.—Water-tower N E.—woods W.—free approach—supplies.
ANDALUSIA	Emergency field—listed by U. S. Air Service.
ANNISTON	Emergency field 5 mi. N.E.—good—camp McClellan —balloon field.
ANNISTON	Golf course field 4 mi. E.—E. of R.R.—1200×3000 ft.
AUBURN	Emergency field—Auburn University—listed by U. S. Air Service.
AUTAUGAVILLE	Emergency field—listed by U. S. Air Service.
ATHENS	Emergency field to N.—runs N. and S.—large and good. W. of Mills and R.R.
ATTALLA	Emergency field 2 mi. S.—runs N. and S.—300 acres cleared from woods therefore easily seen—along S. R.R. —ditches far apart.
BAY MINETTE	Emergency field—listed by U. S. Air Service.
BIRMINGHAM	Dixie field—2½ mi. S.W.—rectangular—1200×2000 ft. runs N. and S.—marked "T"—near cemetery—3 mi. W. of ½ mi. R. track.
BIRMINGHAM	Birmingham Flying Club—Dixie Flying Corporation.
BREWTON	Emergency fields around.
CAMDEN	Emergency field—listed by U. S. Air Service.
CENTERVILLE	Emergency field—listed by U. S. Air Service.
CLANTON	Emergency field—listed by U. S. Air Service.
DEATSVILLE	Emergency field—listed by U. S. Air Service.
DEMOPOLIS	Emergency field—1 mi. S.W. of town and river — Canvas cross—D.E.M.O. on roof of largest building in town.
ELMORE	Emergency field—listed by U. S. Air Service.
ENTERPRISE	Emergency field—listed by U. S. Air Service.
EUFAULA	Emergency field—listed by U. S. Air Service.
EUTAW	Emergency field—listed by U. S. Air Service.
EVERGREEN	Emergency field—listed by U. S. Air Service.
FLORENCE	Emergency fields around.
FAYETTE	Emergency field—listed by U. S. Air Service.
GADSDER	Emergency field—listed by U. S. Air Service.
GREENVILLE	Emergency field—listed by U. S. Air Service.
GREENSBORO	Emergency field—listed by U. S. Air Service.
GRAVEHILL	Emergency field—listed by U. S. Air Service.
HUNTSVILLE	Emergency field—listed by U. S. Air Service.
HUNTSBORO	Emergency field—listed by U. S. Air Service.
HAYNESVILLE	Emergency field—listed by U. S. Air Service.
JASPER	Emergency field 1 mi. due S. of Court House.
JASPER	Long's emergency field 200×1500 ft.—after crops removed.
JENISON	Emergency field—listed by U. S. Air Service.
LINDEN	Emergency field—listed by U. S. Air Service.
MARION	Emergency field—listed by U. S. Air Service.
MOBILE	Emergency field 2 mi. S.E. near F. grounds—100 acres rectangular—drain ditch E. to W.—good approach—near R.R. and end of car line.
MONROEVILLE	Emergency field—listed by U. S. Air Service.

Montgomery	Johnson-Curtiss Airplane Co.—use Taylor field.
Montgomery	Wright field—4 mi. N.W.—Govn. Repair depot—hangars.
Montgomery	Taylor field—18 mi. S.E.—Govn. storage—hangars.
Ozark	Emergency field—listed by U. S. Air Service.
Phoenix	Emergency fields within gliding distance.
Prattville	Emergency field—listed by U. S. Air Service.
Selma	Kopacky field—2 mi. W.—between R.Rs.—1 mi. square.
Speigners	Emergency field—listed by U. S. Air Service.
Thomasville	Emergency field—listed by U. S. Air Service.
Troy	Ray field—2½ mi. out on Brundidge Rd.—marked.
Tuscumbia	Emergency field—listed by U. S. Air Service.
Uniontown	Emergency field—listed by U. S. Air Service.
Verbena	Emergency field—listed by U. S. Air Service.
West Blockton	Emergency field—listed by U. S. Air Service.



No. 1. Taylor Field. 2. Wright Field. 3. River Dam. 4. Power Line runs N. W. 5. Oak Mts. 6. Fair Grounds.

CITIES	ARIZONA
Ajo	Army Air Service field—listed by U. S. Air Service.
Douglass	Army Air Service field—2000 ft. sq.—1 mi. N.E.—4000 ft. alt.—Flight "A" 12th Observation Group.
Flagstaff	Emergency field to S.—½ mi. track—smooth and level—6900 ft. alt.
Fort Huachuca	Emergency field—¼ mi. N. of wireless tower at Fort 600×1200 ft.—N. and S.—Circle and "T" on N. end—good wet—alt. 5200 ft.
Grand Canyon	Emergency field—listed by U. S. Air Service.
Holbrook	Emergency field—listed by U. S. Air Service.
Kingman	Emergency field—1800×1000 ft. N. E. and ½ mi. from R.R. depot—near cemetery—"T" mark—Good De H. field—3400 ft. alt.—gas.
Maricopa	Emergency field—west of town—listed by U. S. Air Service.
Naca	Emergency field—¼ mi. N.E. and W. of Naca Bisbee Road—alt. 4600 ft.—pop. 300.
Nogales	Govn. field—12th. Aero Squadron.
Phoenix	Emergency field—State Fair Grounds.
Prescott	Emergency field.
Tucson	Municipal-Macauley field—2½ mi. S.—Circle mark—2000×1800 ft. runs E. and W.—R.R. on E. side—2 hangars—alt. 2300 ft.
Wilcox	Emergency field.
Yuma	Municipal field—¾ mi. S.W.—W. of RR.—mile S. of river—mark Y T—good oval field 2000 ft. long N. and S.—gas—200 ft. alt.

(Please note new fields and mail to author.)

ARKANSAS

CITIES	
Arkadelphia	McDaniels Pasture—good—2500×1300 ft.—1 mi. from town—N. of R.R. and highway bridges across river—on E. bank—clay soil drained to R.
Batesville	Emergency field—listed by U. S. Air Service.
Berryville	Emergency field—listed by U. S. Air Service.
Blytheville	Emergency field—listed by U. S. Air Service.
Brinkley	Emergency field—listed by U. S. Air Service.
Buffalo Creek	Emergency field—listed by U. S. Air Service.
Dardanelle	Emergency field—listed by U. S. Air Service.
De Witt	Emergency field—listed by U. S. Air Service.
El Dorado	Emergency field—good ¼ mi. S.W.—S.E. of R.R. yard between tracks—Service—1800×1000 ft. House in N.W. corner—275 ft. alt.
Fayetteville	Emergency field—Small Race Track—and State University Farm.
Forrest City	Emergency field—listed by U. S. Air Service.
Fort Smith	Alexander's alfalfa emergency field.—¾ mi. W. along river opposite bridge, 2000×2000 ft, hay shed in center—good—gas and oil—400 alt.
Fort Smith	Country Club field—160 acres—4 mi. N. triangular—1500×1500 ft.—good wet—along R.Ry.—Ark. river N.—cemetery W.—highway S.—good service.
Harrison	Emergency field—listed by U. S. Air Service—½ mi. race track
Hazen	Emergency field—listed by U. S. Air Service.
Helena	Emergency field—listed by U. S. Air Service.
Hope	Emergency field—listed by U. S. Air Service—C. C. Golf.
Hot Springs	Hot Springs field—good—3000 ft. square—near sanitorium—10 mi. N. of Ogden—power line on W.—R.Rys. to E. toward mountains.
Janesboro	Fair Grounds field—49 acres square—⅝ mi. track—good—1 mi. N.W.—Gage field emergency—1200×1200 ft.—1½ mi. N.—trees all around.
Little Rock	Govn.—Emergency Supply Depot—Camp Pike.
Lonoke	Eberts field—formerly Govn.—1 mile N.W.
Lonoke	Emergency field—good baseball park to S.W.—Grandstand.—1000×2000 ft. runs N. and S.—good field 4 mi. N.E.—alt. 300 ft.
Marked Tree	Emergency field—listed by U. S. Air Service.
New Boston	Emergency field—listed by U. S. Air Service.
Newport	Emergency field—listed by U. S. Air Service.
Paragould	Emergency field—listed by U. S. Air Service.
Pine Bluff	Municipal-Packingtown field—good—1½ mi. E.—½ mi. from river between R.R. tracks—40 acres square—supplies—alt. 250 ft.
Prescott	Emergency field—listed by U. S. Air Service.
Stuttgart	Emergency field—listed by U. S. Air Service.
Texarkana	Country Club field—good—3000×4000 ft. 2 mi. S.E.—bridge over R.R. in S.W.—small lake in S.W. part—private—clay soil drained.
Warren	Emergency field—listed by U. S. Air Service.
Wynne	Emergency field—listed by U. S. Air Service—40 acres.

CALIFORNIA

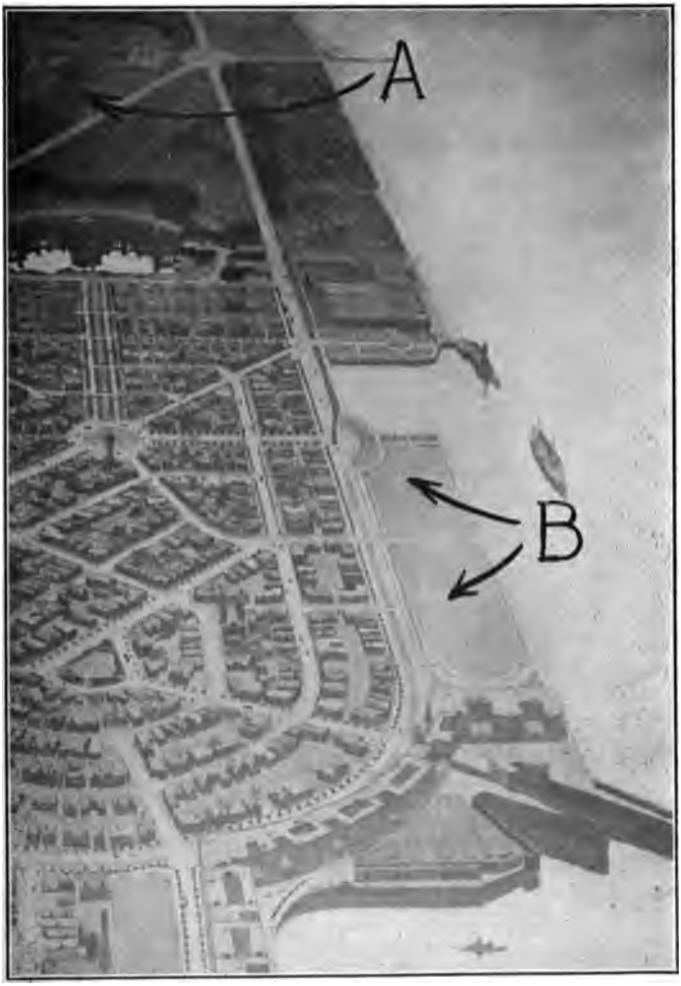
CITIES	
Arcadia	Ross field—Govn. balloon school.
Bakersfield	Commercial Club field—3 mi. N.W.—2600 ft. runway—15 oil tanks N. near Stan. Oil Co. filling station. Another good field—2 mi. N. on highway near oil tanks—1½×½ mi. all level—315 alt.—also Forest Patrol Station.
Beaumont	Emergency field—listed by U. S. Air Service.
Berkeley	Jacuzzi Brothers—aeroplane propellers.
Berkeley West	Hall Scott Motor Car Co.—L6 airplane motor.
Bloomington	Emergency field—2000×2000 ft.
Blythe	Municipal field—good—1 mi. N.—R.R. on E.—mark "T"—near cemetery—1320×1600 ft.—gas and oil—wet weather landing—270 ft. alt.
Calexico	Emergency field—listed by U. S. Air Service—Camp Beacon, Cavalry Post.
Calipatria	Calipatria Field—fair—E. of R.R. tracks—mark "T"—1250×1600 ft.
Camp Kearny	Calipatria Field—good—on parade grounds—Army Post.
Concord	Municipal field—S.E. edge ideal and large—house and windmill to N.
Corona	Corona field—listed by U. S. Air Service.
Delano	Wallace Ranch field—2 mi. E.—ideal—marked.
El Centro	Puryear-Municipal field—Govn. border patrol station—¾ mi. N.—8 temporary hangars—1320×2640 ft.
Elsinore	Emergency field—good to S. of town and R.R.—1 mi. W. of river and N. of lake—40 acres square—marked—garage service—alt. 1300 ft.
Eureka	Humboldt Aero Club field—good—2 mi. E.—1600×600 ft.—hothouses and hangar to S.—Stan. Oil Gas.
Fresno	Forkner-Municipal field—good—4 mi. N.W.—2400×800 ft.—canal to E. of field and power line N.—wet weather land—293 ft. alt.—and used as Forest Patrol Station and Knox-Mundorff Company.
Hemet	Hemet field—Emergency—listed by U. S. Air Service.
Hollister	Turner field—Hollister Aerial Transport Co.—2 mi. N.—cross roads and water tank S. E. of field—mark T, 4000×1000 ft.—service—H. test gas and Lib. Aero oil—wet weather land—alt. 300 ft.
Hollywood	de Mille field—No. 2—good—Mercury Aviation Co.
Holtville	Emergency field—S.E. near town—2500×2500 ft.—another field S.W.—0 ft. alt.
Lancaster	Emergency field—fair grounds—1 mi. N.W.—825×300 ft.—good approach—2350 ft. alt.
Lake Port	Forest Patrol Station—1 mi. N.W.—825×300 ft.
Lake Tahoe	Tahoe Inn field—1800×3000 ft. ideal—marked—alt. 6225.
Long Beach	Chateau Thierry field—good—4½ mi. N.—along Blvd.—2000×600 ft.—2 hangars—"T"—runs N. and S.—supplies by E. S. Dougherty School of Aviation.—Wet weather land,
Los Angeles	Aero Club of California
Los Angeles	Municipal (Goodyear Park) field—good—6 mi. S.—¼ mi. ×1 mi.—supplies.
Los Angeles	Kinner Airplane and Motor Corp.—231 acre ideal field on Long Beach Blvd. between Southgate and Lynwood.

Los Angeles	Syd Chaplin Aircraft Corporation—Curtiss Distributor.
Los Angeles	The Ace Magazine—(Published Monthly).
Los Angeles	J. M. Wild—Distributor—Lincoln Standard Planes.
Marysville	Emergency field—listed by U. S. Air Service—race-track.
Merced	Merced Emergency field—listed by U. S. Air Service.
Needles	Municipal field—good—4 mi. N. on W. bank of river—mark "Circle"—1000×1600 ft.—runs N. and S.—Stan. Oil products—wet weather land—470 ft. alt.
Nevada City	Emergency field—listed by U. S. Air Service—race-track.
North Island	Field of 2500 acres on North Island in San Diego Bay.
Oakland	Durant field—good—Chevrolet Motor Car Co.—5 mi. S.E. on 82 ave.—R. Roads and concrete cannery to S.—hangars N.E. end—73 acres—2300 ft. long—runway.
Ontario	Municipal (Latimer) field—ideal.
Oroville	Oroville-Municipal field—good—4½ mi. S.W. of S.P. and W. P. R.R. tracks—"OROVILLE" on Municipal Bldg. in center of town—mark "O" on field—1500×1500 ft.—formerly Forest Patrol Station—300 ft. alt.
Palmdale	Palmdale field—½ mi. S.W.—good—¼ mi. W. of S. P. R.R. tracks—2000×1000 ft.—Union Oil Co.—wet weather land—2640 ft. alt.
Pasadena	Municipal field at Altadena Country Club—large and good.
Pasadena	Sierra Airdrome on Blvd.—4 mi. E.—hangar—marked—supplies—de Mille field No. 3—Mercury Aviation Co.—wet weather land—950 ft. alt.
Perris	High School field—¼ mi. N.—near school and between R.R. and Blvd.—30 acres—good—wet weather land—supplies—another field 1 mi. S.E. was used by Army pilots—1450 ft. alt.
Portersville	Wilko Mentz field—commercial—service and supplies.
Red Bluff	Forest Patrol Station field—listed by U. S. Air Service.
Redding	Municipal field—S.W.—city limits upon plateau—rectangular—2000×1000 ft.—marked—supplies—wet weather land—527 ft. alt.

A "Movie" Airview of Durant Field, Oakland, California.

Redlands	Municipal field—1½ mi. N.W.—750×1800 ft.—good—½ mi. N. of pumping station—supplies—wet weather land—1356 ft. alt.
Redwood City	Varney Field & Flying School—supplies for Bristol aeroplanes, Standard J1 planes and Hispano motors.
Riverside	March field—Active Army Air Service field—Forest Patrol Station.
Sacramento	Mather field—Active Air Service Field—Trans.-Cont. race stop, and Aerial Mail field—97 mi. to San Fran.
San Diego	Aero Club of San Diego.
San Diego	San Diego Air Line field—opposite marine base—¼ mi. S. of golf links—½ mi. N. of R.R.—green hangar—400×1700 ft.—wet weather land—gas and oil on field—15 ft. alt.—also Rockwell field.
San Diego	Rockwell field, North Island—Army and Navy Air Station.
San Francisco	Pacific Aero Club—185 O'Farrell Street.
San Francisco	Cressy field in the Presidio—Army Air Service field.
San Francisco	Varney field at Ingleside—hangar space and supplies for Lincoln Standard planes and Hispano motors.
San Francisco	Earl P. Cooper Airplane Co.—Curtiss distributor.
San Francisco	Montgomery (Marina) field—Aerial mail field—hangar.
San Jose	Garden City Aviation field—2½ mi. E. on highway—near golf club—650×1800 ft.—good—wet weather land—hangar "T"—supplies—150 ft. alt.
Santa Anna	Emergency field—to south—listed by U. S. Air Service.
Santa Barbara	Zenith Aviation Co. field—center of city along ocean front—500×1500 ft.—wet weather land—supplies—for seaplanes also.
Santa Barbara	Loughead Seaplane Station—commercial.
Santa Barbara	Loughead Aircraft Manufacturing Co.—aeroplanes.
Santa Clara	Pennington-Todd field on N.W. edge city along highway near orchard—R.R. ¾ mi. N.—3000×2000 ft. hangar and "T" wet weather land—supplies by Earl Cooper Co. and Jacuzzi Bros., propellers—72 ft. alt.
Seeley	Municipal field—(for air mail)—W. of town near R.R. tracks and highway—runs E. and W.—supplies—160 ft.
Sierra Madre	Sierra airdrome—2 mi. out—Sante Fe R.R. to S.—1500×2000 ft.—3 mi. from Ross field balloon school—hangar and runway × on field—wet weather land—supplies—4 mi. E. of Pasadena on Blvd.—800 ft. alt.
Shadra	Emergency field—listed by U. S. Air Service.
Stockton	Tuxedo field (Cal. Aerial Transport)—1½ mi. N.W.—E. end of canal—1800×1200 ft.—hangar and "T"—wet weather land—Stan. Oil and Gas—runs E. and W.
Tracy	So. Pa. Ball Ground field—½ mi. S.—1600×1100 ft. between R.R. branch near six big tanks—also water tower—64 ft. alt.
Tulare	Emergency field—listed by U. S. Air Service.
Venice	Thos. H. Ince field (Delay Aviation Co.)—¼ mi. W.—2000×500 ft. at junction of R.R. and Blvd.—hangars—marker—good wet.
Venice	Pacific Airplane and Supply Co.—Standard planes—0×5 and Liberty 6 motors.
Ventura	Rotary field.

Wilmington	Smith Aircraft Co. field—1½ mi. N.W.—2000×1000 ft. along Blvd.—one hangar—wet weather land—good.
Woodland	Yolo Flier's Club field—4 mi. W.—209 acres near Swimming pool and golf course—"YOLO" in circle—58 ft.
Yosemite	National Park field—open to aviators by Park.
Yreka	Cody field—1½ mi. S.—Forest Service fire patrol field.



San Francisco's Two Airports: (*A*) Crissy Field; (*B*) Montgomery Field, the New Mail Airport.

COLORADO

CITIES	
Aguilar	Emergency field—listed by U. S. Air Service.
Aspen	Emergency field—listed by U. S. Air Service.
Buena Vista	Municipal field—1 mi. S.W.—½ mi. N.W. of State Reform—near R.R.—1 mi. W. of river—2640×1300 ft.—marker—E. and W.—wet weather land—alt. 7900 ft.—pop. 1200.
Burlington	Emergency field—listed by U. S. Air Service—good open fields around—very strong winds.
Colorado Springs	Curtiss-Humphreys field—N.E. city limits—near R.R.—house on south side field—tel. wire on N.E. and W.—2400×1800 ft.—service and supplies—wet weather land—alt. 6100 ft.—pop. 30,000.
De Beque	Open fields around for emergency.
Denver	Aero Club of Colorado.
Denver	Curtiss-Humphreys Airplane Co. field—5 mi. N.E. State Capital—2½ mi. N.E.—city park race-track—¼ mi. S. of college—white hangar on S.E. corner—1800 ft. square—wet weather land—service and supplies—alt. 5300 ft.—pop. 300,000.
Denver	Martin-Sweet Motor Co.—Lincoln Standard planes.
Eagle	Johnson Bros. Ranch—¼ mi.×1½ mi. long by river in Canyon—¼ mi. E. of town.
Estes Park	Stanley Hotel field—½ mi. S.E.—2400×600 ft.—hangar and marker—wet weather land—Curtiss-Humphreys service and supplies alt. 7500 ft.—pop. 300.
Flager	Emergency field—listed by U. S. Air Service—good open fields around but very strong winds.
Glenwood Springs	1 mi. W. along river and R.R.—near brick school and white golf house—small house on field—1500×900 ft.—E. and W.—wet weather land—garage service—alt. 6500 ft.—pop. 5000.
Gypsum	A few open fields around for emergency.
Grand Junction	Municipal-High Line field—3½ mi. N.E.—good—60 acres sq.—wet weather land—alt. 4500 ft.—pop. 8665.
Kobe	Level country for emergency landings.
Limon	Emergency field—listed by U. S. Air Service.
Leadville	Level country for emergency landings.
Malta	9580 ft. altitude with plenty of open fields.
New Castle	A few open emergency fields.
Pueblo	Municipal field—½ mi. N. State Fair grounds near dairy—2000×1400 ft. E. and W.—hangar—Texas Oil Co.—good wet weather—alt. 4685 ft.—pop. 50,000.
Riverside	Level country for emergency landings.
Red Cliff	Emergency field—listed by U. S. Air Service.
Salida	Emergency field—good—4000 acres—4 mi. W.—S. of smelters—alt. 7000 ft.—open fields through Canyon.
Trinidad	Bennett Aviation Co. field—¼ mi. E.—near hospital—1038×2600 ft.—between highway and R.R.—near cemetery—E. and W.—hangar and marker—good wet weather—Test Gas and Oil—alt. 6000 ft.—pop. 14,000.
Walcott	Level country around for emergency landings.

AIRWAYS THROUGH COLORADO

Cheyenne, Wyo., to Denver, Col.; follow the U. P. R.R. south with plenty of open fields for emergency landing.

Denver to Colorado Springs; open fields east of tracks.

Colorado Springs to Pueblo; plenty of open country.

Pueblo to Salida; a few open fields on leaving but country gets rough. Mountains to the W. with hills, ditches, trees and streams with no field at Cañon City and 4 mi. W. you pass through the Royal Gorge Cañon, which is too narrow to fly through, so an altitude of 11,000 ft. must be reached to fly over the mountains in safety, with the next good landing field at Salida.

Salida to Buena Vista passes over Browns Cañon requiring an altitude of 11,000 ft. for safety; without a field at Nathrop; but the level country will afford an emergency landing, and 8 mi. on is Buena Vista, which is rather unsafe at 9768 ft. altitude with mountains on each side and the field so small.

Buena Vista to Malta, there is some level country at Riverside and Kobe for emergency landing. Malta is 9580 ft. altitude with plenty of open fields.

Malta to Eagle-Leadville is 10,200 ft. altitude, with level country around. Red Cliff is down the western slope and impossible to land. Walcott has level country for emergency and a good field listed at Eagle.

Eagle to Glenwood Springs—7 mi. W. is Gypsum with a few open fields. Then over the Grand River Cañon, as it is too narrow to fly through, to Glenwood Springs, which is dangerous, with high mountains all around.

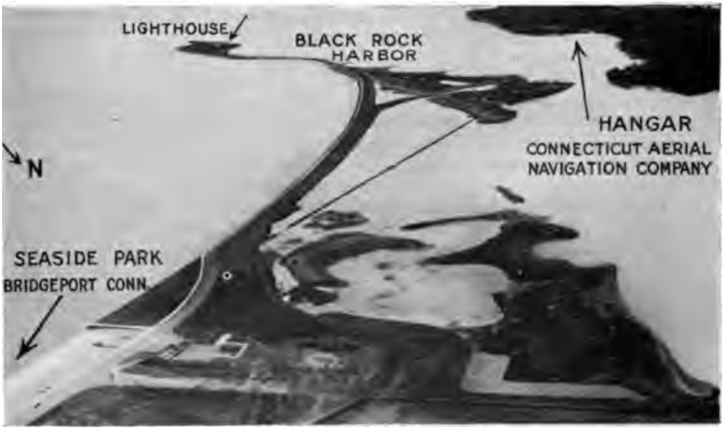
Glenwood Springs to Grand Junction—12 mi. W. is New Castle with a few open fields, and 44 mi. W. is De Beque with open fields. The last 33 mi. is over country where a landing can be made most anywhere. Grand Junction is 449 mi. W. of Denver with the best field on the western slope and the flying from this field is good most any time of the year.

Pueblo to Trinidad—There are open fields for emergency.

Colorado Springs to Omaha, Nebr.—The country is level with fields and a landing can be made near Limon. From here to Flagler are good open field, but, flying conditions are bad due to very strong winds almost all the time. On to Burlington the country is level with plenty of open fields around the town. Between Burlington, Colo., and Omaha, Nebr., through Kansas and Nebraska the country is fairly level with plenty of open fields to land in emergency.

CONNECTICUT

CITIES	
Ansonia	Emergency field—listed by U. S. Air Service.
Bridgeport	Bridgeport Airport—Seaplane Station—3 mi. S.—hangar —service and supplies—Conn. Aerial Navigation Co.
Bridgeport	Emergency field—Aero Club of Connecticut.
Danbury	Tucker field—passenger carrying emergency field.
Hartford	Emergency field—Goodwin Park—golf course—listed by U. S. Air Service.
Hartford	Aero Club of Hartford.
Hartford	Spenc-Aero Taxi Service—Commercial flying.
Meriden	Emergency field—listed by U. S. Air Service.
Middletown	Emergency field—Conn.-Ind. School—listed by U. S. Air Service.
New London	Emergency field—Mitchell Ball Park—listed by U. S. Air Service.
New Haven	Yale University Aero Club.
Pawcatuck	Emergency field—listed by U. S. Air Service.
Plainville	Trumbull field—¾ mi. N.E.—1500×600 ft.—green roof colonial house at S. —end field—runs N. and S.—highway and wires on E.—garage service—good wet weather—alt. 400 ft.—pop. 5000.
Stamford	Holloween Park—Emergency for J. N's.—2½ mi. S.E.
Waterbury	Emergency field—1½ mi. N.W.—1500×300 ft.—W. bank of river—near falls.—factory on S. end—pop. 100,000.



DELAWARE

CITIES	
Middletown	Emergency field—listed by U. S. Air Service.
Newark	Emergency field—listed by U. S. Air Service.
Wilmington	Emergency field—listed by U. S. Air Service.
Wilmington	Aero Club of Delaware.

(Please note new fields and mail to author.)

DISTRICT OF COLUMBIA

CITIES	
Washington	Bolling field—Active Air Service field—S. W.—2900× 1900 ft.—row of hangars—Potomac and Anacostia rivers to S. and W.
Washington	Anacostia Seaplane Base—U.S. Naval Air Station—along Anacostia river across road from Bolling field.
Washington	Aero Club of Wash. D. C.
Washington	U. S. Air Service Magazine—(Published monthly).

(*U. S. Air Service Photo.*)
Over the Heart of a City, but a Landing Field within Easy Gliding Distance.

FLORIDA

CITIES	
ARCADIA	Carlstrom field—Army Air Service field—Pilot's school.
ARCADIA	Door field—Army Air Service field.
AVON PARK	Municipal field—good—2 mi. W.—2200×1800 ft.—small ditch lengthwise—Orange Grove N.—road and wires S.—marked—good wet—fuel—alt. 200 ft.
BALDWIN	Emergency field—listed by U. S. Air Service.
BARTOW	Emergency field—listed by U. S. Air Service.
BRADENTOWN	Municipal field—golf course—3100×500 ft.—1 mi. S.—Grandstand etc. on W.—2 ditches—fair landing E. and W.—garage—was used by Carlstrom field pilots—good wet—alt. 30 ft.—pop. 4000.
BROOKSVILLE	Emergency field, listed by U. S. Air Service.
DAYTONA	Municipal—Daytona Beach—good—18 mi.×500 ft. wide—service and fuel on beach—pop. 10,000.
DAYTONA	Municipal Seaplane Station on Halifax river—near Yacht Club—runway and turning plate, supplies—(Daytona Flying Club).
DEFUNIAK SPRINGS	Municipal field—¼ mi. N.—about 900 ft. square—road and power line on E.—good wet—fuel—alt. 320 ft.
DELAND	Dixie field—good—1800×1800 ft.—2 mi. N.E.—brick road and wires—S. side—fuel by Dixie Aerial Corp.—to have hangar and marker.
EUSTIS	Eustis field—good—1200×1500 ft.—2 mi. N.W.—road, wires and trees on N. and S. sides—lakes ¼ mi. N.W. and S.W.—Gas shed in corner Dixie Aerial Corp.
FORT MEADE	Municipal field—fair—1200×500 ft.—¾ mi. E.—along river. Flag pole at one end—garage—used by Army pilots.
FORT MYERS	Municipal field—good—2600 ft. square—2 mi. S.W.—along road and wire—near golf course—garage—flag pole on field—alt. 6 ft.—pop. 7500.
FORT PIERCE	Municipal field—good—to S.—800×1200 ft.—marked—between Dixie Hyway, Power line and R.R., wires—Army used—garage fuel—
GAINESVILLE	Janvis field—2 mi. out—Board of Trade interested.
GAINESVILLE	Oval Prairie field—5 mi. square—ideal but 8 mi. out.
GLENDALE	Emergency field to N.—400×500 ft.—highway and wires—on W.—
HAMPTON SPRINGS	Golf course—good—400×1500 ft.—along road, R.R. and wires—ditch across end—low wires on S. side opposite R.R.
HOBE SOUND	Emergency field—listed by U. S. Air Service.
IMMOKALEE	Emergency field—listed by U. S. Air Service—Indian Settlement.
JACKSONVILLE	Camp Jackson Rifle Range—good—3000 ft. L shape—marked—Camp and power line on S. and W. sides—¼ mi. from river—near Youkon.
KEY WEST	U. S. Naval Air Station—seaplanes only.
KEY WEST	Florida-West Indies Air Ways Co.—Aerial Mail to Havana, Cuba.

Kissimmee	Municipal field—good—1500×1800 ft.—1 mi. N.E.—marked—hyway, wires and field to S.—near lake—gas shed and flag pole on field—Army used—alt. 75 ft.
La Belle	Emergency field—listed by U. S. Air Service.
Lakeland	Municipal field—Inter-city Airline—hangars, school and service.
Leesburg	Emergency field—listed by U. S. Air Service.
Miami	Aero Limited—Flying Boat Passenger service to Cuba.
Miami	Curtiss Aeroplane and Motor Corp.—50 acres—1340×2000 ft.—5 mi. W. near canal locks along road—2 hangars and service—in winter months—good wet—land in Y—alt. 20 ft.—pop. 50,000.
Moorehaven	Emergency field—good—2500 ft. square—2 mi. N.—near Lake Okeechobee—flag pole in corner—R.R. between field and lake.
Moultrie	Emergency field—listed by U. S. Air Service.
North Labelle	Municipal field—good—1500×1500 ft.—2 mi. N.E.—flag pole W. corner—along road—river S.E.
Ocala	Emergency field—fair—1¼ mi. W.—300×1500 ft.—fair grounds to E.—houses, road and wire to S.
Okeechobee	Municipal field—good—1000×1200 ft.—¼ mi. N.—cross mark—between R.R. and creek—good wet—fuel.
Orlando	Orlando Aero Co. field—good—1350×1350 ft.—2 mi.W. hangar and gas shed—Army used—good wet.
Ormond	Emergency field—listed by U. S. Air Service.
Palm Beach	America Trans-Oceanic Co.—seaplane station—service and supplies—Curtiss distributor for Florida—school and passenger work.
Palm Beach	Aero Limited-Flying Boat Passenger service to Miami.
Palmdale	Emergency field—listed by U. S. Air Service.
Pensacola	Municipal—Kiwanis Club field—2 mi. N.—4000×10,000 ft.—circle mark—E. of R.R. near lettered buildings—good wet—alt. 30 ft.—pop. 30,000.
Pensacola	U. S. Naval Air Station—seaplanes only—Blimp school.
Sanford	Dixie Aerial Corp. field—good—1320×2250 ft.—2 mi. S.—"T" mark—road, trees and wires on W.—good wet—Army used—fuel.
Sarasota	Municipal field—good—1320 ft. square—1 mi. E.—cross mark and gas shed—road, wires, field and bay to S.—Army used—good wet—garage near.
St. Augustine	Golf course field—but landing prohibited—Municipal field considered.
St. Cloud	Emergency field—listed by U. S. Air Service.
Seabreeze	Emergency field—listed by U. S. Air Service.
Seabring	Emergency field—listed by U. S. Air Service.
Tallahassee	Municipal field—good—700×1000 ft.—1 mi. E.—cross mark—good wet and approach—garage near—alt. 190 ft.—pop. 8000.
Tampa	Emergency field—inside ½ mi. race track—runs N. and S.—land from N.—good wet—larger fields farther out—alt. 10 ft.—pop. 60,000.
Titusville	Municipal (Sylvan Lake) field—S.W.—W. of R.R.—800×500 ft.—garage near—many good prairie fields around—alt. 6 ft.—pop. 1500.

GEORGIA

CITIES	
Albany	Rawson Park field—good—900×1100×1300 ft.—1 mi. N.W. along road in cut—S.W. of fair grounds—used by Albany Aerial Co.—Army used.
Americus	Govern.—Souther field—good—U. S. Air Service—5260 ft. square—few mi. N.—hangars—good wet—alt. 365 ft.
Athens	Municipal (Rolfe-Epps) field—good—1500×1680 ft.—3 mi. E.—land on runways.
Atlanta	Candler field—fair—750×600 ft. part of oval 2½ mi. track—best but bordered by track on N. and W.—good approach—bad wet.
Augusta	Camp Hancock—parade ground—good—1200×1500 ft. S.W.—S. of reservoir, road and wires—power line and road on E. side—commercial use.
Blakely	Fair Grounds field—fair—250×750 ft.—1 mi. W.—R.R. and wires run past S.E. corner and to grandstand on E. side—good wet.
Brunswick	U. S. Naval Air Station—seaplanes only.
Columbus	Government Camp, Benning field—2 canvas hangars.—Also race track emergency.
Canton	Emergency field—listed by U. S. Air Service.
Cordele	Emergency field—Farmer's pasture only.
Cumberland Island	Emergency field—listed by U. S. Air Service—on beach.
Dawson	Emergency field—listed by U. S. Air Service.
Douglas	Emergency field—listed by U. S. Air Service.
Ellaville	Emergency field—listed by U. S. Air Service.
Fitzgerald	Hanley field—good—40 acres—1 mi. S. between R.R. and highway—Convict camp on N.—Army used—good wet—alt. 515 ft.—pop. 10,000.
Fort Valley	Baseball Park field—emergency only—300×400 ft. to W.—has been used.
Griffin	Municipal race-track—fair—400×1200 ft.—oval—S. of city—fair wet.
Hawkinsville	Emergency field—listed by U. S. Air Service.
Helena	Emergency field—listed by U. S. Air Service.
La Fayette	Emergency field—listed by U. S. Air Service.
McRae	Municipal field—listed by U. S. Air Service.
Macon	Municipal-Central City Park—good—in mile track—1500×1000 ft. E. of city—S. of river—Army used—good wet—alt. 328 ft.—pop. 75,000.
Marietta	Emergency field—C. Club golf course.
Marshalville	Emergency field—only farmer's pasture.
Madisonville	State school field—1500×1500 ft.—mark circle.
Milledgeville	Emergency field—450 ft. ×1500 ft. golf course.
Montezuma	Emergency field—only farmer's pasture.
Moultrie	Emergency field—1800×750 ft.—golf course.
Oglethorpe	Emergency field—only farmer's pasture.
Plains	Emergency field—450×1200 ft.—listed by U. S.
Richland	Emergency field—listed by U. S. Air Service.
Rome	Fair grounds field—good—1250×400 ft.—W. of city along Coosa river—"T" in circle—good wet—C. Club across river—alt. 625 ft.—pop. 15,000.

SAVANNAH.......Municipal field—500×2500 ft.—in Daffin Park.—4 mi. S.—good—runs E. and W.—good wet—used commercially—between wires and car line—alt. 45 ft.—pop. 100,000.

SHELLMAN.......Emergency field—1200×750 ft.—listed by U. S. Air Service.

SUGAR VALLEY....Emergency field—900×700 ft.—listed by U. S. Air Service.

SYLVANIA.......Emergency field—listed by U. S. Air Service.

SYLVESTER.......Emergency field—farmer's pasture—listed by U. S. Air Service.

THOMASVILLE....Municipal-Spence field—good—1100×350 ft. to N. of city—between highway and R.R.—"T" in circle—good wet—N. and S.—alt. 275 ft.—pop. 10,000.

TIFTON.........Emergency field—300×900 ft.—listed by U. S. Air Service.

VALDOSTA.......Old fair grounds—1 mi. N.—golf course—3 mi. N. W. and a possible emergency landing—new fair grounds—½ mi. track to be prepared—both fields doubtful—inquire.

VIDALIA.........Emergency field—listed by U. S. Air Service.

WASHINGTON.....Emergency field—listed by U. S. Air Service—fair grounds.

WAYCROSS.......Municipal field—listed by U. S. Air Service.

WAYNESBORO....Emergency field—listed by U. S. Air Service—Rosemont Dairy farm.

WRENS..........Emergency field—listed by U. S. Air Service.

CITIES

IDAHO

ATHOL..........Good fields—E. and W. of town—emergency only.

BELMONT........Good fields—E. and W. of town—emergency only.

COEUR D'ALENE.Municipal field, ideal—½ mi. square between R.R. and power lines—4 mi. N. of city and lake—hangars, etc. to be built—"T" mark—good wet—used by Govn. Forest Patrol—alt. 2180 ft.—pop. 10,000.

CORBIN.........Emergency field only.

GARWOOD.......Good fields—E. and W. of town—emergency only.

HAUSER.........Good fields—E. and W. of town—emergency only.

HOPE...........No field—(field one-half way to Sandpoint north of lake).

LEWISTON.......Emergency field—good—1½ mi. E.—2100×3000 ft. S. of creek—"T" mark—N.W. of race track—alt. 750 ft.

MOSCOW........Municipal field—fair—300×1200 ft. in race course to W of city—W. good approach only—power lines E.—buildings N. and S.—good wet—alt. 750 ft.

MOSCOW........Emergency field—good—2500×500 ft.—1 mi. N.W. along road and wires—W. of creek—telegraph wires on N. side 25 ft. high.

POCATELLO......Municipal-Brady field—good—2000×3000 ft.—between R.R.—"T" mark—runs N. and S.—good wet—alt. 4882 ft.—pop. 16,000.

ROTHDRUM......Emergency fields only—small town.

TWIN FALLS.....Emergency field—only.

TWIN LAKES....Good field—E. and W. of town—emergency only.

CITIES	ILLINOIS
Abington	Emergency field—listed by U. S. Air Service.
Aledo	Emergency field—listed by U. S. Air Service.
Alton	Emergency field—State hospital grounds—1½ mi. E.—rolling—200×600 ft.—across road and wires from hospital and smoke stack—emergency only.
Ashburn	Aero Club of Ill., field—good—10 mi. S.E. Congress hotel —1 mi. square—3 hangars—soggy when wet—fuel and service by Ralph C. Diggins Co. Flying school.
Aurora	Emergency field—listed by U. S. Air Service.
Avena	Emergency field—listed by U. S. Air Service.
Beckemeyer	Emergency field—listed by U. S. Air Service.
Belleville	Scott field—listed Govn. temp. storage and supplies.
Belvidere	Emergency field—listed by U. S. Air Service.
Blandinvile	Emergency field—listed (poor farm) by U. S. Air Service.
Bloomington	Municipal-Foreman field—good—990×1826 ft.—2 mi. E.—mark square in circle—windmill in N. end—C. Club to N.W.—good wet—fences around—alt. 855 ft.
Breeze	Emergency field—one-half mile race track.
Brownstown	Emergency field—listed by U. S. Air Service.
Caberry	Emergency field—listed by U. S. Air Service.
Carlinsville	Emergency field—listed by U. S. Air Service.
Carlyle	Emergency field—listed by U. S. Air Service.
Carrollton	Emergency field—listed by U. S. Air Service.
Cartersville	Emergency field—Dr. Farrill field—U. S. Air Service.
Casey	Emergency field—listed by U. S. Air Service.
Cedar Point	Emergency field—listed by U. S. Air Service.
Centralia	Emergency field—used by Liberty Loan pilots—small—S. of town-land from S.—land E. and W. on field next along R.R.—½ mi. long.
Champaign	Emergency field—Country Club grounds—listed by U. S.
Charleston	Emergency field—listed by U. S. Air Service.
Chatsworth	Emergency field—Haberborn farm—listed by U. S.
Chicago	Aero Club of Chi.—Club Rooms, Clark st.
Chicago	Aero Club of Ill.—Club Rooms, 430 So. Mich. ave.
Chicago	Chicago Airport—8 mi. N.—55 acres—2 mi. N.W. Edgewater Beach Hotel—½ mi. E. of drainage canal—hangars and supplies by Chicago Aircraft Corporation—clear approach.
Chicago	Continental Aircraft, Incorporated—aircraft dealers.
Chicago	Curtiss Aeroplane and Motor Corporation—distributors.
Chicago	Ralph C. Diggins Co., aircraft dealers and flying school.
Chicago	James Levy Aircraft Co., aircraft dealers.
Chicago	Aerial Mail field—listed under Forest Park, Ill.
Clinton	Emergency field—listed by U. S. Air Service.
Corina	Emergency field—listed by U. S. Air Service.
Damianville	Emergency field—listed by U. S. Air Service.
Danville	Emergency field—Old Soldiers' Home—listed by U. S.

Decatur	Emergency field—1½ mi. out—20 acres along R.R.—N. of R.R. Car repair shop—no obstructions—alt. 678 ft.
Delavan	Ross field—listed by U. S. Air Service.
Dennison	Emergency field—60 acres—listed by U. S. Air Service.
Down	Emergency field—listed by U. S. Air Service.
Dupo	Emergency field—listed by U. S. Air Service.
Duquoin	Emergency field—listed by U. S. Air Service.
Elgin	Emergency field—Hornbeck farm—listed by U. S.
Elmwood	Emergency field—listed by U. S. Air Service.
Fairfield	Emergency field—listed by U. S. Air Service.
Fieldon	Emergency field—listed by U. S. Air Service.
Forest Park	Checkerboard (Air Mail) field—10 mi. W. of Congress hotel—Des Plains river E.—Old R. track W.—mail hangars W. side—steel hangar N.E.—2500 ft. square.
Freeburg	Emergency field—listed by U. S. Air Service.
Galesburg	Commercial field—2½ mi. W.—2640×1320 ft.—½ mi. N. of cemetery—large barn across road to W.—good wet—service by L. W. Wright, Curtiss dealer; and Caldwell Bros.—alt. 756 ft.—pop. 25,000.
Havana	Emergency field—listed by U. S. Air Service.
Hettick	Emergency field—listed by U. S. Air Service.
Highland	Emergency field—listed by U. S. Air Service.
Hinkely	Emergency field—listed by U. S. Air Service.
Kankakee	Emergency field—State Insane As.—listed by U. S.
La Salle	Emergency field—listed by U. S. Air Service.
Litchfield	Emergency field—listed by U. S. Air Service.
Lora	Emergency field—listed by U. S. Air Service.
MaComb	Compton field—good emerg.—875×1520 ft. S.E. of town—residence along W. side—other sides clear—Also ½ mi. fair ground field—25 acres oval.
Malta	Emergency field—listed by U. S. Air Service.
Marshall	Emergency field—listed by U. S. Air Service.
Mascoutah	Emergency field—listed by U. S. Air Service.
Metropolis	Emergency field—listed by U. S. Air Service.
Monmouth	Emergency field—80 acres near Country Club.
Monticello	Emergency field—listed by U. S. Air Service.
Montrose	Emergency field—listed by U. S. Air Service.
Morrisonville	Emergency field—listed by U. S. Air Service.
Mount Olive	Emergency field—listed by U. S. Air Service.
Mount Sterling	Emergency field—Fair grounds—listed by U. S.
Mount Vernon	Fair ground field—½ mi. track—land from S.—good 80-acre field to S.—across road and wires used by Army—good wet—now in grass.
Murphysboro	Emergency field—listed by U. S. Air Service.
New Baden	Emergency field—listed by U. S. Air Service.
New Memphis	Emergency field—listed by U. S. Air Service.
Newton	Emergency field—listed by U. S. Air Service.

Odin............Woodland Farm field—ideal—106 acres—2 mi. W.—road and wires S. side windmill S.E. corner—road on E. side—Army used.
O'Falion.......Emergency field—listed by U. S. Air Service.
Olney..........Miller Farm field—40 acres—good—N.E. between roads and wires—orchard across road to W.—good 30-acre field N. of bushes—road to E.—these fields are one.
Ottawa.........Emergency field—listed by U. S. Air Service—King field.

Pana...........Emergency field—listed by U. S. Air Service.
Paris...........Emergency field—listed by U.S. Air Service.
Peoria.........Aero Club, Peoria, Ill.
Peoria.........Peoria driving Park, 1 mi.-oval and fair grounds.
Perron.........Emergency field—listed by U. S. Air Service.
Pinckneyville..Emergency field—listed by U. S. Air Service.
Pontiac........Emergency field—Poor farm—listed by U. S. Air Service.
Princeton......Emergency field—listed by U. S. Air Service.

Ramsey.........Emergency field—listed by U. S. Air Service.
Rantoul........Chanute field—Govn.—1 mi. square S.E. edge—hangars—good wet—aerial mail—on St. Louis to Chicago route—alt. 700 ft.—pop. 2000.
Robinson.......Wilkin Farm field—40 acres square to S. of town—road and wires to W. side and N.—house and ditch in N.W. corner—good fields around.
Rockford.......Camp Grant—Govn.—2500×2500 ft.—drill grounds.
Rock Island....Franning field—2 mi. out—Trans-Cont. race stop—along Rock river—R.R. ½ mi. S.—1320×2640 ft.—runs E. and W.—good wet—fuel—alt. 570 ft.—pop. 35,000.
Roodhouse.....Strang Farm pasture field—N.E. corner of town—40 acres—trees on N. side—hedge fence on S.—road and wires to W.
Roseville......Emergency field—listed by U. S. Air Service.

Sandoval.......Woodward Farm field—good—106 acres—1¾ mi. N.E.—windmill in S.E. corner—roads and wires on E. and S. sides—good wet—Smelter plant ½ mi. S. across B. and O. R.R.
Shelbyville....Emergency field—listed by U. S. Air Service.
Shumway.......Emergency field—listed by U. S. Air Service.
Sparta.........1 mile track field—Fair grounds—S.W. of town—good wet—garage fuel—alt. 500 ft.—pop. 4000.
Springfield.....Fair Ground field—1 mi. oval—½ mi. track inside mi. oval, no fence—land E. and W.—stock barns to W. and N.—fair bld. to S.
Staunton.......Emergency field—listed by U. S. Air Service.
Streator.......Emergency field—C. C. golf course—listed by U. S.
Sullivan.......Emergency field—County Poor farm—listed by U. S.
Sumner.........Lett Farm field—good—33 acres square—1 mi. N. along road and wires to E.—used by Liberty Loan pilots—good approach.
Swanwick......Emergency field—listed by U. S. Air Service.

Trenton........Turner Farm field—good—20 acres square to N.E.—N. of hedge road and wires—W. border the same—house and barn on N.—cemetery N.E.

Troy	Emergency field—listed by U. S. Air Service.
Urbana	Emergency field—Country club—listed by U. S.
Waukegan	Emergency field—mi. S. of town—good field.
Wedron	Emergency field—listed by U. S. Air Service.
Wheaton	Emergency field—listed by U. S. Air Service.
Winchester	Jerry Ring Farm pasture field—½ mi. N.E.—20 acres square—S. of small race track—S. of farm bldgs.—E. of trees and road—land N.E.×S.W.
Woodlawn	Watkins field—good—S.W. of town—80 acres square—R.R. and wires on N. and W. sides—station near N.W. corner—Army used.

(Please note new fields and mail to author.)

INDIANA

CITIES	
ATTICA	Emergency field—as seen from the air. (Illustration.)
BOSWELL	Emergency field—listed by U. S. Air Service.
BRAZIL	Emergency field—listed by U. S. Air Service.
BUTLER	Emergency field—listed by U. S. Air Service.
EFFINGHAM	Emergency field—listed by U. S. Air Service.
EVANSVILLE	Aero club of Evansville.
EVANSVILLE	Commercial—field good—4½ mi. E.—2640×1320 ft.—circle mark—service by Hurst Aeroplane Co. and Graham Bros. Aviation Co.—alt. 400 ft.—pop. 100,000.
FOWLER	Emergency field—listed by U. S. Air Service.
FORT WAYNE	Emergency field—listed by U. S. Air Service.
FORT BENJAMIN HARRISON	Army post—listed by U. S. Air Service.
INDIANAPOLIS	Aero club of Indiana.
INDIANAPOLIS	Speedway field—aviation repair depot—5 mi. W.—hangars and mark—inside large oval motor race track.
INDIANAPOLIS	Multi-X Aircraft and Motors Co.
IRELAND	Emergency field—listed by U. S. Air Service.
KNIGHTSTOWN	Emergency field—½ mi. E.—pop. 3000.
KNOX	Emergency field—Schelling farm—listed by U. S. Air Service.
KOKOMO	Municipal field—Curtiss-Indiana Airplane Co.—3 mi. S.E.—1320×2640 ft.—S. of Country club—good wet—hangar, circle and cross—supplies—alt. 811 ft.—pop. 34,000.
LAFAYETTE	Aero club of Purdue University.
LOGANSPORT	Aero club of Northern Indiana Hospital grounds.
LOOGOOTEE	Aero club—listed by U. S. Air Service.

(*U. S. Air Service Photo.*)

A Good Field Near Attica, Indiana.

MOUNT VERNON	Hageman field—1400×1400 ft.—¼ mi. N. of river—factory and brick house E. of field—good wet—alt. 400 ft. pop. 6000.
NEW CASTLE	Rose City Co. field—1750×1200 ft.
MUNCIE	Emergency field—Private field—Ball's park.
NEW HARMONDY	Emergency field—listed by U. S. Air Service.
NEW RICHMOND	Emergency field—listed by U. S. Air Service.
PETERSBURG	Emergency field—listed by U. S. Air Service.
RICHMOND	Chenoweth Aviation Co. field of 37 acres—pop. 25,000.
SCHERERVILLE	Emergency field—listed by U. S. Air Service.
SOUTH BEND	Aero club of Notre Dame University.
SOUTH BEND	Emergency field—meadow at Notre Dame Un.
SPENCER	Emergency field—listed by U. S. Air Service.
SULLIVAN	Emergency field—listed by U. S. Air Service.
TERRE HAUTE	Aero club of Ind.
TERRE HAUTE	Emergency field—listed by U. S. Air Service.
VINCENNES	Emergency field—listed by U. S. Air Service.
WABASH	Service Aviation, Training and Trans. Co. field.—ideal—1440×1750 ft.—trees and fence in N.E. corner—hangar along fence and wires to E.—4 "T" markers—wind vane on S. end.
WASHINGTON	Emergency field—listed by U. S. Air Service.

(*U. S. Air Service Photo.*)

Landing Field Near Indianapolis, Ind.

IOWA

CITIES	
ATLANTIC	Edward Lang field—good—90 acres—1½ mi. N.—W. of road and wires—N. of R.R. depot and river—S.E. is mi. track also used—soft if wet.
BLAIRSBURG	Emergency field—listed by U. S. Air Service.
BONAPARTE	Emergency field—listed by U. S. Air Service.
CHARLES CITY	Emergency field—listed by U. S. Air Service.
COUNCIL BLUFFS	Emergency field—¼ mi. S.—small, 10 acres—between R.R.—N. of Green house along road—has been used—between Lake Manowa and city.
DAVENPORT	Wallace field—commercial—1800×2500 ft—4½ mi. E.—½ mi. E. of 7 smoke stacks—between R.Ry. and Miss. river—4 tent hangars—movable arrow wind vane—service and supplies by Wallace Bros. Co.—alt. 750 ft.—pop. 56,727—Also 1 mi. track.
DES MOINES	Aero Club of Iowa.
DES MOINES	Herring field—N.W.—1000×3000 ft.—name in circle—hangars—good wet—supplies by Iowa Aircraft Co.—Herring Motor Co.—alt. 799 ft.—pop. 105,000.
DES MOINES	Camp Dodge—Army camp—Also Ft. Des Moines—air mail.
DES MOINES	Gadbury Airplane Co. field—passenger carrying and photography.
DANNELSON	Emergency field—listed by U. S. Air Service—adjoins race track.
DOW CITY	Grandall field—good—162 acres—¼ mi. S.—bordered by river and R.R. and wires—depot and grain elevator in corner—S. of ball park across R.R. tracks.
ELDORA	Emergency field—listed by U. S. Air Service.
FORT DODGE	Curtiss-Iowa Aircraft Corporation.
IOWA CITY	Emergency field—listed by U. S. Air Service—aerial mail.
LOWDEN	Emergency field—listed by U. S. Air Service.
MISSOURI VALLEY	Messer pasture field—hangar for Miss. Valley Aero Co.
MASON CITY	Emergency field—listed by U. S. Air Service.
NORTHWOOD	Emergency field—listed by U. S. Air Service.
OSAGE	Emergency field—listed by U. S. Air Service.
OSKALOOSA	Emergency field—listed by U. S. Air Service.
PELLA	Emergency field—listed by U. S. Air Service.
ROCKFORD	Emergency field—listed by U. S. Air Service.
ROCKWELL	Emergency field—listed by U. S. Air Service.
SAC CITY	Emergency field—listed by U. S. Air Service.
SHELL ROCK	Emergency field—listed by U. S. Air Service.
SIOUX CITY	Emergency field—listed by U. S. Air Service—Sioux City Flying Club.
STANWOOD	Emergency field—listed by U. S. Air Service.
WATERLOO	Emergency field—listed by U. S. Air Service—C. Club Golf Course.
WEBSTER CITY	Webster City Aero Co. field—on N.W. edge—50 acres—ideal—canvas hangars and marker—high test gas and oil.

KANSAS

CITIES	
Arkansas City	Municipal field—good—80 acres—2 mi. N. near 8 white tanks—"T" mark—good wet—hangar and supplies by William-Hill Aeroplane Co.—alt. 1140 ft.—pop. 12,000.
Belleville	Fair Grounds field—good—½ mi. track—hangar and mark to be built—other emergency fields around town.
Dodge City	Emergency field—several good fields around.
Emporia	Municipal field—good—40 acres square—2 mi. W.—1 mi. W. of highway—2 mi. N. Santa Fe R.R.—good wet.
Fort Leavenworth	Army post—good field—may be municipal.
Fort Riley	Camp Funston—two small fields—to be enlarged.
Fort Scott	Emergency field—listed by U. S. Air Service.
Fredonia	Municipal field with 4 hangars and repair shop to be built—other good field around—also fair grounds.
Goodland	Municipal field—½ mi. N.E.—180 acres—other good fields—near ball park and S.E. fair grounds—good wet.
Garden City	Emergency field—½ mi. track.
Kensington	Municipal field—good—1 mi. S.E.—60 acres square—along road and wires—farm house ¼ mi. W.
McPherson	Darrow field—1500×500 ft.—good—40 acres—½ mi. N.—soft if wet—farm house to N.—town to S.
Mankato	Municipal field—to be selected—good fields around.
Marysville	Municipal field—1500×1100 ft.—L shape—good—1½ mi. S.E.—along road and wires—ravine to E.—to be marked—good wet.
Norton	Municipal field—good—½ mi. W.—40 acres—along R. Is. R.R. and wires.
Overland	Aero Club of Kansas state.
Parsons	Municipal field—fair—½ mi. E.—in ½ mi. track—other fields around.
Phillipsburg	Municipal field—1 mi. S.—40 acres—along road and wires—creek to S.
Pratt	Commercial field—good—1500×900 ft.—hangar and windmill in S.E. corner—R.R. ¼ mi. S.—river 1¼ mi. S.—good wet—alt. 1900 ft.—pop. 5100; also ½ mi. track.
Salina	Salina field—1 mi. S.W.—80 acres—along road and wires—trees and bldgs. in S.E. corner.
Scott City	Municipal field—½ mi. S.E.—80 acres—along road and wires—good wet.
Smith Center	Municipal field—½ mi. W. in ½ mi. oval track—hangar and mark to be—field has been used—local owner of plane Mr. Dimond.
Topeka	Aero Club of Topeka.
Topeka	Topeka field—2½ mi. from Capitol building—S.W.—80 acres—good wet—service by Curtiss-Kansas Aircraft.
Washington	Municipal field—½ mi. N.W.—40 acres square—along road and wires—house in S.E. corner—R.R. to S—creek ½ mi. N.W.—good wet.
Wichita	Aero Club of Wichita.
Wichita	Laird Co. field—1½ mi. N.E.—1380×1360 ft.—4 hangars and circle—service, gas and oil—good wet—Army used with D.H. 4—formerly Stratford field.

CITIES	KENTUCKY
BARBOURSVILLE	Commercial field and flying school.
CORYDON	Emergency field—listed by U. S. Air Service.
GEORGETOWN	Emergency field.
LEXINGTON	Race track field.
LOUISVILLE	Kentucky Aeroplane and Supply Co. field—6 mi. E.
LOUISVILLE	Emergency field—Camp Taylor—army camp.
MIDWAY	Emergency field—listed by U. S. Air Service.
MORGANFIELD	Emergency field—listed by U. S. Air Service.
PADUCAH	Emergency field—listed by U. S. Air Service.
STITHTON	Godman field—Govn.—Camp Knox.
WEST POINT	Godman field—Govn.
WINGO	Emergency field—listed by U. S. Air Service.

CITIES	LOUISIANA
ALEXANDRIA	Camp Beauregard—listed by U. S. Air Service.
BATON ROUGE	1200 ft. square—Army used—So. Stan. Oil Co.—circles and cross marks—to be given up by C. of C.—may be cultivated.
CROMLEY	Emergency field—rice farm—1½ mi. N.—road on E. and S. sides—watered for rice—800×1500 ft.
DELTA	Municipal field—Burney field—listed by U. S. Air Service.
EUNICE	Emergency field—½ mi. E. and S. of R.R.
HARRISONBURG	Emergency field—listed by U. S. Air Service.
HOUMA	Municipal field—on fair grounds and 16 acres adjoining.
JENNINGS	Emergency rice field—1½ mi. N.W.—along road—1200×3000 ft.—1½ mi. from river.
KINDER	Emergency field—listed by U. S. Air Service.
LAKE CHARLES	Gersner field—Govn. temp. storage—15 mi. S.E.
LAKE PROVIDENCE	Emergency field—listed by U. S. Air Service.
LAFAYETTE	Emergency field—W. of city.
MINDEN	Emergency field—listed by U. S. Air Service.
MONROE	Stubbs field—1½ mi. S.E.—1200×1800 ft.—R.R. to N. and W.—near round house and tank.
NATCHITOCHES	Emergency field—listed by U. S. Air Service.
NEW ORLEANS	Aero Club of Louisiana.
NEW ORLEANS	Fellman field—1 mi. N.E. of park—park in S.E. of city on Miss. river—hangar.—850×600 ft.—good wet—fence around—used by Aero Club and N.O. Aviation Co.
NEW ORLEANS	Emergency field—1½ mi. race track.
NEW ORLEANS	Richardson Airplane Company—service and supplies.
OPELOUSAS	Emergency field—listed by U. S. Air Service.
PINEVILLE	Emergency field—ball alfalfa field—was Army used.
SHREVEPORT	Municipal field—oval 1 mi. track—for commercial use.
TULLULAH	Emergency field—listed by U. S. Air Service.
WELSH	Emergency field—rice farm—1½ mi. W. between R.R. and highway—near stream—500×1500 ft.—18 mi. E. of Lake Charles.

CITIES	MAINE
AUBURN	Emergency field—Northeast Airplane Co. Inc.—passenger flights.
AUGUSTA	Emergency field—½ mi. S.W.
LEWISTON	Emergency field—along river.
OLD TOWN	Bachelder field—500×2000 ft.
PORTLAND	Emergency field—N.W. of city.

(Please note new fields and mail to author.)

CITIES	MARYLAND
ABERDEEN	Government Proving grounds—8 mi. S.E. of R.R.—bridge over Susq. river—hangars and marker.
BALTIMORE	Dundalk field—2000×2250 ft.—follow Penn. R.R., S.E. —N. bank of Potopsca—hangar—runs N. and S.—Flying Club field—supplies by Central Auto Co. Curtiss agents—good wet—alt. 15 ft.—pop. 650,000.
CAMP MEADE	Camp Meade—Government—Emergency fields around.
CHASE	Emergency field—listed by U. S. Air Service—race track.
COLLEGE PARK	Air Mail field—7 mi. from Wash. D.C.—20 rods E. of B. and O. R.R.—marked—2 hangars—land on runways—alt. 25 ft.—pop. 500.
ELK MILLS	Emergency field—listed by U. S. Air Service.
ELKTON	Emergency field—listed by U. S. Air Service.
EMMITSBURG	Emergency field—listed by U. S. Air Service.
HAGERSTOWN	Municipal Sewerage Commission field—E. of city along road and trolley—W. of creek—800×3000 ft.—runs E. and W.—good wet—garage—Also emergency field—200 ft. N. of reservoir—N.W. of city—1500×2000 ft.—runs N. and S.—Also C. club emergency—alt. 500 ft.—pop. 27,000.
HAVRE DE GRACE	Race-track field—1 mi. track—1 mi. S.E. city—good wet—used by mail pilots—alt. 40 ft.—pop. 4500.
LAUREL	Race-track field—emergency—listed by U. S. Air Service.
NORTHEAST	Emergency field—listed by U. S. Air Service.
SPARROWS POINT	Emergency field—listed by U. S. Air Service.

CITIES	MASSACHUSETTS
Auburn	Emergency field—900×1600 ft.—by roads—stone wall S. and E.—houses to W.
Amherst	Durfee field at agricultural college—emergency.
Ashburham	Emergency field—½ mi. S. along RR.—30 acres—good—trees around.
Bedford	Commercial field—operated by Curtiss Airplane Co.
Beverly	Emergency field—listed by U. S.
Boston	Aero Club of Mass.
Boston	Curtiss Airplane Company of New England.
Boston	International Aircraft Corporation—field at Weston—marked "T"
Boxford	Commercial field—1½ mi. N.—along road—near pond—hangar—100 acres.
Brockton	Commercial field—1½ mi. N.—along road—Ripley field.
Cambridge	Soldiers field—dangerous—72 acres—along Charles river by grandstand and stadium.
Chatham	Naval air station—seaplanes only.
Cliftondale	Emergency field—on race-track—land E. and W. on N. track only—track is 6 mi. N. from Boston.
Dorchester	Franklin field playground—danger—50 acres—near Boston—emergency only.
Danvers	Emergency field—30 acres square—N. of reservoir—along road—trees to E.
Essex	Emergency field—race-track.
Falmouth	Emergency field—good—1½ mi. out along harbor—175 acres—houses in field along street—across road and creek from boathouse.
Grafton	Emergency field—small—¾ mi. S.—along road—near fork—house on S. side.
Greenfield	The Meadows field—½ mi. square—3½ mi. out along road—2 mi. from Deerfield.
Hingham	Emergency field—1800×700 ft.—15 mi. S.E. Boston.
Hudson	Emergency field—one-half way to Marlboro on car line between 3 barns and river—12 acres long.
Marlboro	Curtiss field—4½ mi. E. on farm road off Main road—stone wall divides 30 acres.
Nantasket Beach	Kenberma park field—near beach—L shaped—marked circle—service and supplies by Amer. Aerial Corp. of Boston.
New Bedford	Fort Redman—drill ground.
Newburyport	Emergency field—listed by U. S. Air Service.
North Beverly	Emergency field—S.E. of reservoir—25 acres—3 mi. out.
Northampton	Goddard field—near trotting park—3000×6000 ft.—ideal—good wet.
Orange	Washburn field—2 mi. E.—1200×2400 ft.—good—between river and road.
Orange	The Orange Plains field—¼ mi. W.—ideal—size ¼ mi. square.
Pittsfield	Emergency field—listed by U. S. Air Service.
Pittsfield	Aero Club of Pittsfield.

PRINCETON......Emergency field—listed by U. S. Air Service.

READVILLE......Fair grounds track—small emergency field.

REVERE.........Lynnway Aircraft Corp. field between Revere Beach and Lynn, along Blvd.—30 acres—near white bldgs. with red roofs—hangar and supplies.

SOUTH BOSTON...Eastern Aircraft Corporation—repair service and supplies.

SOUTH FRAMINGHAM........State Muster ground—2600×1580 ft.—18 mi. S. W. of Boston, and is best field near Boston for big ships—hangar.

SOUTH SUDBURY..Amer. Aerial Corp. fields—25 acres—S.W.—along highway—at R.R. crossing—marked "A" in circle—service and supplies—15 mi. W. of Boston.

SPRINGFIELD.....Springfield Airport—300 acres—2½ mi. S.—between river and R.R.—letters on hangar roof—field marked—service by Eastern Air. Corp.

WORCESTER......State Battery field—at Barry farm—near C. club—100 acres—runs N. and S.—by farm bldgs. and orchard—ideal—good wet—stone wall around.

WESTON.........Inter. Aircraft Corp. field of 80 acres—hangar and marker.

Airview of Springfield Municipal Airport.

MICHIGAN

CITIES	
ADRIAN	Emergency field—good—1 mi. N.E.—between fair grounds and road across from Adrian College—500×1400 ft.—good wet.
ALBION	Emergency Finley field—to S.W.—40 rods square—trees and wires N.—woods and river S.—hedge on E.—Army used but may be planted.
ANN ARBOR	Spalding Farm field—1000×1200 ft.—road, house and wires W. side.
ANN ARBOR	University of Mich. field—700×1050 ft.—grandstand N.—house S.E. corner.—10 ft. wall around—emergency only.
BAD AXE	Emergency field—fair grounds.
BATTLE CREEK	Camp Custer field—5½ mi. N.—1950×2700 ft.—marker—windmill tower N.E. corner—good wet—alt. 870 ft.—pop. 36,000.
BAY CITY	Municipal-Fair grounds—½ mi. track—2 mi. E.—part rough.
BUCHANAN	Emergency field—listed by U. S. Air Service.
CARO	Emergency field—listed by U. S. Air Service.
CHELSEA	Emergency field—listed by U. S. Air Service.
CROSWELL	Emergency field—listed by U. S. Air Service.
DEARBORN	Emergency field—listed by U. S. Air Service.
DECATUR	Emergency field—listed by U. S. Air Service.
DELHI MILLS	Emergency field—listed by U. S. Air Service.
DETROIT	Aero Club of Michigan.
DETROIT	Aviation Country Club—823 acres of land and two lakes.
DETROIT	Packard field—12 mi. N.E.—1½ mi. in from Lake St. Clair—hangars and barn—good wet—service and supplies by Packard Motor Car Co.—also Thompson Airplane Co., Curtiss distributors.
DEXTER	Emergency field—listed by U. S. Air Service.
DOWAGIAC	Heddon field—S.W.—30 acres—marked cross—good fuel—service by Heddon Aviation Co.—alt. 758 ft.—pop. 6000.
FLINT	Welch field—1 mi. E.—2500×1500 ft.—between wires and court street—trees in N.E. corner—good wet—wires E. side.
FOWLER	Emergency field—listed by U. S. Air Service.
FOWLERVILLE	Emergency field—½ mi. track-trees in N. end—good fields around.
GLENWOOD	Emergency field—listed by U. S. Air Service.
GRAND HAVEN	Emergency field—Spring Lake Country Club.
GRAND RAPIDS	Aero Club of Grand Rapids—alt. 642 ft.—pop. 150,000.
GRAND RAPIDS	Grand Rapids Airport—4 mi. S.—along road—near car line—2000×1200 ft.—hangar and shed—N.W. corner—service by Roseswift Airplane Co.
GRAND RAPIDS	Fair grounds and Country Club for emergency also.
HILLSDALE	Emergency field—inside ½ mile race-track.
IMLAY CITY	Emergency field—listed by U. S. Air Service.
JACKSON	Municipal-Sparks field—2 mi. S.W. in park—1500×1500 ft.—mark "T"—good wet—test gas—Sparks Withington Co.—alt. 920 ft.—pop. 55,000.

Kalamazoo	Emergency field—listed by U. S. Air Service.
Lansing	McPherson field—2 mi. W.—between car line and woods—600×600 ft.—houses to E.—trees to W.—also golf course for emergency.
Lansing	Mich. Agricultural College—ideal—large fields—Army used.
Lapeer	Municipal Park field—small and rough—emergency only.
Lawton	Emergency field—listed by U. S. Air Service.
Manchester	Emergency field—listed by U. S. Air Service.
Mayville	Spafordy field—listed by U. S. Air Service.
Midland	Dow Chemical Co. field—across river from plant—40 acres—ideal—1400×1600 ft.—good wet—Also fair grounds emergency.
Milan	
Mount Clemens	Selfridge field—U. S. Air Service Station.
Mount Pleasant	Transport field—1 mi. S.E.—350×850 ft.—near factory and cemetery—other good fields around city.
Niles	Emergency field—listed by U. S. Air Service.
Plymouth	Emergency field—listed by U. S. Air Service.
Pointe Aux Barques	Emergency field—listed by U. S. Air Service.
Roseville	Packard field—near white buildings with red roofs and wind cones on same—hangars and shed in S.W. corner—1320×3400 ft.
St. Charles	Emergency field—listed by U. S. Air Service.
Saginaw	Fair grounds—2 mi. E. in ½ mi. track—ideal—clear approach.
Sandusky	Emergency field—listed by U. S. Air Service.
Spring Lake	Country Club field—1 mi. N.—50 acres—good—object to landing.
Standish	Municipal field—½ mi. track—good but small—good approach.
Stockbridge	Hoffmeyer farm—¼ mi. N.—along woods—70 acres fenced—Army used—best part in N.E. corner
Wayne	Emergency field—listed by U. S. Air Service.
Yale	Emergency field—listed by U. S. Air Service.
Ypsilanti	Maulbetsch Farm field—30×76—rods between roads and wires—Army used—planted in oats this summer.

(Please note new fields and mail to author.)

MINNESOTA

CITIES	
Amboy	Emergency field.
Appleton	Emergency field—listed by U. S. Air Service.
Breckenridge	Emergency field—listed by U. S. Air Service.
Cannon Junction	Emergency field—listed by U. S. Air Service—several good fields.
Clara City	Emergency field—listed by U. S. Air Service—several good fields.
Crookston	Emergency field—listed by U. S. Air Service—S.W. of city good.
Crow River	Emergency field—listed by U. S. Air Service—several good fields.
Dakota	Emergency field—listed by U. S. Air Service.
Dresbach	Emergency field—listed by U. S. Air Service.
Duluth	Justofsan field—Whiteside Island in St. Louis river—6 mi. N.W.—200 acres—alt. 800 ft.—pop. 100,000—bay ideal for seaplanes.
Duluth	Emergency field—Superior C. club golf links.
Fairmont	Emergency field—listed by U. S. Air Service.
Fort Snelling	Parade ground—emergency field—Army post.
Fort Snelling	as seen from the air.
Golden	Emergency field—listed by U. S. Air Service.
Graceville	Emergency field—listed by U. S. Air Service.
Hibbing	Pritchard field to S.—ideal—to be used by Forest patrol pilots.

(*U. S. Air Service Photo.*)

Landing Field at Fort Snelling, Minneapolis, Minn.

Lake City	Emergency field—listed by U. S. Air Service—fields N. and E.
Maple	Emergency field—listed by U. S. Air Service.
Mayer	Emergency field—listed by U. S. Air Service.
Maynard	Emergency field—listed by U. S. Air Service.
Milan	Emergency field—listed by U. S. Air Service.
Minneapolis	Aero Club of Minneapolis.
Minneapolis	Curtiss-Northeast Airplane Company—distributor—field opposite fair grounds.
Minneapolis	Olympian Air-ways Inc. Commercial Avation.
Minneapolis	Twin City Municipal field—3 mi. speedway track—7 mi. S.E. Minn.—7 mi. S.W. of St. Paul—2 hangars and marker—good wet—fuel and service by Twin City Aero Corp.—supplies by Security Airplane Co. and Curtiss Northwest.
Minnesota City	Emergency field—listed by U. S. Air Service.
Montevideo	Emergency field—listed by U. S. Air Service.
Red Wing	Emergency field—listed by U. S. Air Service.
Saint Paul	Aero Club of St. Paul.
Saint Paul	Twin City Municipal field—7 mi. S.W. in 3 mile speedway track.
Sleepy Eye	Berkner field—commercial—service and supplies—E.F. Berkner Aviation Co.
Valley	Emergency field—listed by U. S. Air Service.
Wabasha	Emergency field—S. of city—close to highway—good.
Waconia	Emergency field—listed by U. S. Air Service.
Wayzata	Emergency field—listed by U. S. Air Service.
Wheaton	Emergency field—listed by U. S. Air Service.
White Rock	Emergency field—listed by U. S. Air Service.
Willmar	Glorum Farm—Emergency—40 acres—¾ mi. S.E.—1 mi. S. of R.R.—alt. 1100 ft.—pop. 5800 ft.
Winona	Biesanz Municipal field—3500×4000 ft.—3 mi. W. of two bridges over Miss. river—marker white cross—good wet—test gas and oil—alt. 700 ft.—pop. 20,000.

(U. S. Air Service Photo.)

Curtiss Field Near St. Paul, Minn.

MISSISSIPPI

CITIES	
Aberdeen	Fair grounds—in race track which is to be a stock farm.
Artesia	Emergency field—listed by U. S. Air Service.
Belzoni	Emergency field—listed by U. S. Air Service.
Biloxi	Emergency field—listed by U. S. Air Service.
Canton	Lutz Farm field—ideal—2½ mi. N.W.—600×1900 ft.—good wet—along road—C. of C. will equip if necessary.
Charleston	Emergency field—1 mi. E.—may be municipal and erect hangar.
Clarksdale	Memphis Aerial Co. field—2 mi. N.—1000×1500 ft.—clear approach—Tent N.E. end.
Como	Emergency field—listed by U. S. Air Service.
Corinth	Suratt field—3 mi. N.E. along road—near house and barn—woods ½ mi. away on all sides—was Army used.
Greenville	Country Club field—but object to landing.
Grenada	Emergency field—listed by U. S. Air Service.
Holly Springs	Emergency field—listed by U. S. Air Service.
Jackson	Emergency field to N.W.—across road from fair grounds—400×1000 ft.—other good fields a few miles out.
Kosciusko	Emergency field—listed by U. S. Air Service.
Louisville	Emergency field—listed by U. S. Air Service.
Laurel	Municipal—fair grounds—½ mi. S.—830×310 ft. in ½ mi. track—Madison station—Johnson Farm field—½ mi. E. along road—700×1200 ft.—windmill in S.W. corner—good wet.
Meridian	Crowe field—2 mi. S.W.—along R.R. to N.—road and wires to E.—best part along road away from R.R. and ditches.
Newton	Emergency field—listed by U. S. Air Service.
North Carrolton	Duncan's field—½ mi. N.W.—28 acres—runs E. and W.—wire fence around—alt. 225 ft.—pop. 400.
Senatobia	Emergency field in race-track.
Tupelo	Emergency field in race-track
Tutwiler	Emergency field—listed by U. S. Air Service.
West Point	Payne field—3 mi. N.—528 acres—12 hangars and other buildings—formerly U. S. Air Service field.

Please note new fields and mail to author.

MISSOURI

CITIES	
Bogard	Emergency field—listed by U. S. Air Service.
Booneville	Emergency field—listed by U. S. Air Service.
Cape Girardeau	St. Vincent College field—2½ mi. S.—rectangular—½ mi. runs N. and S.—good wet—Stand. Oil fuel—to be marked "T"—alt. 346 ft.—pop. 12,000.
Centralia	Emergency field—listed by U. S. Air Service.
Caruthersville	Emergency field—listed by U. S. Air Service.
Chaffee	Emergency Farm field—¾ mi. E. of Frisco depot—1300 ft. square—houses and trees to N., and E.—good wet—other.
Chillicothe	Emergency field—listed by U. S. Air Service.
Clinton	Owen Farm field—1 mi. E.—along road—near cemetery—40 acres—good wet.
Fayette	Emergency field—listed by U. S. Air Service.
Festus	Burgess Farm field—1 mi. N.E.—70 acres square—wheat field—R.R. to W. and S.E.—other good field around.
Flat River	Emergency field—1½ mi. N.—in V. of R.R.—500×2400 ft. good—across tracks from R.R. yards—Smelting Co.
Hamilton	Emergency field—fair grounds—hospital near.
Independence	Emergency field—listed by U. S. Air Service.
Jefferson City	Opel Farm fiel[illegible]4 mi. N.—180 acres—bordered by R.R. and roads—also C. club grounds 5 mi. W.
Jonesboro	Emergency field—listed by U. S. Air Service.
Kansas City	Aero Club of Kansas city.
Kansas City	Kellerstrass field—900×900 ft.—"T" shaped—7 mi. S.—3 mi. S. electric park—5 mi. E. of Kansas river—3 white tent hangars—test gas by Hiatt Motors Co.
Kansas City	Municipal field—near river—Swope Park field—6 mi. S.E.—600×1500 ft.—40 acres—along parkway—service by Valentine Gephart.
Leasburg	Emergency field—listed by U. S. Air Service.
Lebanon	Vernon Farm field—2 mi. S.W.—40 acres square—between R.R. and road—coal chute ¼ mi. N.E.
Marshall	Emergency field—listed by U. S. Air Service.
Mexico	Old fair grounds field—2 mi. S.E.—now a 100-acre.
Monett	Emergency field—listed by U. S. Air Service.
New London	Emergency field—listed by U. S. Air Service—race track.
Poplar Bluff	Emergency field—listed by U. S. Air Service.
Richland	Fair grounds—600×1600 ft.—S.E. of town—fair wet—garage service—alt. 1140 ft.—pop. 1027.
Rolla	Rolla Golf Club field—2000×2000 ft. square—½ mi. W.—State school buildings—¼ mi. N.E.—Stan. Oil gas.—was used by Scott field pilots—alt. 1150 ft.—pop. 2500.
Saint Genevieve	Emergency field—Oberle farm field—1 mi. S.E.—along R.R. on N. side—houses on S. side.
St. Louis	Aero Club of St. Louis.
St. Louis	Municipal-Forest Park—3 mi. S.W. of city—1800×1600 ft.—in Forest park—between police stables on E. and park stables on W.—Govn. hangar and white cross.
St. Louis	St. Louis Airport on Natural Bridge rd.—near Brighton—160 acres—3 mi. from Missouri river.
Springfield	Snavely Aerial Corp. field—adjoins Pheps Grove park on S.—to be marked with circle.

MONTANA

CITIES	
ARLEE	Emergency fields—E. and W. of station—other good ones along river banks.
BIG TIMBER	Emergency fields—several to W.—ideal.
BILLINGS	Municipal field—2 mi. N. on Rim Rock—300 ft. above city level—ideal—80 acres—good wet—supplies—alt. 3100 ft.—pop. 20,000.
BOZEMAN	Municipal field—in oval—750×2100 ft.—ideal—marked—alt. 4770 ft.
BRIDGES	Curtiss-Montana Airplane Co. field—near race track on runways—1800×1800 ft.—soft if wet—hangar barn.
BUTTE	Municipal field—5 mi. S.—along stream between R.R. and road—80 acres—mark "T"—ideal—service by Inland Empire Aerial Corporation—alt. 5800 ft.
COLUMBUS	Municipal field—to N.E.—1200×1300 ft.—good wet—grandstand on field across road from house—good fields around.
DIXON	Emergency fields—good—to W. and E. of town—Bison Range 6 mi. N.
DRUMMOND	Emergency Wheat field—along R.R.—trees and creek around S. and W.—1500×2000 ft.—soft if wet—other field to E.
ELLISTON	Emergency field—along R.R. to W. of town.
FORSYTH	Woolston field—2½ mi. S.E.—along road—600×5000 ft. fence around—ideal—hangar and supplies by Mr. Woolston who has 2 canucks—river widens near Forsyth—alt. 2500 ft.
FORT KEOGH	Government Reservation—See Miles city.
GARRISON	Gerdt's Pasture field—100 acres ideal—1 mi. S.E.—river and R.R. on E. and N. sides—trees and creek on W.—good wet—alt. 4400 ft.
GLENDIVE	Emergency fields—good fields—down Yellowstone R. on table lands.
GREAT FALLS	Great Falls field—½ mi. E.—1 mi. square—E. of Missouri river and large circular roof pavilion—good wet—alt. 3200 ft.—pop. 24,000.
HAVRE	Mabee field—1½ mi. N.W.—900×3000 ft.—between river and road along 100-ft. hill—good wet—2 planes used by Mr. Mabee—hangars—alt. 2500 ft.—good fields to S. and W. of town.
HELENA	Fort Harrison field—N.W. 1200 ft. square—"T" mark—near Fort buildings—good wet—gas and oil—alt. 4000 ft.—pop. 18,200.
HERON	Emergency field—W.—town a Flag Sta. and P.O. on N.P.R.R. in Mt. Pass.
KALISPELL	Municipal field—½ mi. N.W.—1500×2500 ft. along Rd—fenced—ideal—proposed hangar and mark—alt. 2500 ft.
LAUREL	Municipal field to S.W.—along R.R.—1800 ft. square—grandstand and ball park in N.W. corner—drains poor—to mark "T."

LIVINGSTON	Yellow Stone Park Av. Co. field—S.W.—along irrigation ditch—1800×2600 ft.—ideal—wires to S. and E.—hangar to be in N.E. corner—alt. 4400 ft.—other good fields around.
MANHATTAN	Municipal field—½ mi. S.W.—1500×2500 ft.—along R.R. and wires—fenced—Irrigation ditch N.—18 in. ditch runs N.W. to S.E. otherwise ideal—M in circle—service by Inland Empire Aerial Corp. of Butte—alt. 4600 ft.
MILES CITY	Municipal—Fort Keogh—1½ mi. S.—along R.R.—3000 ft. square—good wet—hangar and mark to be—Fort to S.—alt. 2350 ft.—good fields to billings on S. side of Yellowstone river.
MISSION	Emergency depot here only which is 8 mi. E. of Livingston—good wet—good fields around in this big valley.
MISSOULA	Municipal at Fort—4 mi. S.W.—40 acres in 200-acre field—between roads and wires—hangar and mark to be—good wet—supplies—alt. 3200 ft.—pop. 18,000—also 40 acres near fair grounds.
PARADISE	Emergency field—E. of town—80-acre triangle—between R.R. and road—good wet—good field E. and W. through valley.
PARK CITY	Emergency field—good—1 mi. W. along R.R.
PERMA	Emergency field—S. of city—E. of Perma through Mt. pass along N.P.R.R. and Columbia river are many good fields.
PLAINS	80-acre hay field—between Col. river and R.R.—near station.
REED POINT	Good pasture fields—W. of town—alt. 4000 ft.
THOMPSON FALLS	Midway between Missoula and Spokane, Wash.—105 miles to each—1000 acres E.—to be marked—alt. 2450 ft.
TOWNSEND	Good large pasture fields—to S. and E. of town.
WINSTON	Broad flat country—E. and W. of city—strong winds—land rolling and very stony near city.

NEBRASKA

CITIES	
ALLIANCE	Municipal (Reddish) field—¾ mi. W.—50 acres—runs N. and S.—R.R. to E.—roads W. and N.—good wet.
BUSHNELL	Emergency fields—good—to S. of town.
COLLAWAY	Emergency fields—around town—good.
DUNNING	Emergency fields—ideal—E. of town in fork of river.
FORT CROOK	Govn. parade grounds—12 mi. S. of Omaha—15 acres E. of fort—along RR.—4½ mi. W. of RR. bridges over Platt river.
GRAND ISLAND	G. I. Aero Co. field—1½ mi. E.—75 acres—along U. P. R.R.—2 hangars and "T" mark—good wet—Curtiss distributor—alt. 1700 ft.—pop. 14,000.
HASTINGS	Creeth-Snyder Aero Co. field—S.—2500×1500 ft.—hangar to E.—good wet on S. end—service and supplies—alt. 1700 ft.—pop. 13,000.
HASTINGS	College Camp grounds—1½ mi. S.—25 acres—Col. bldgs. E.—trees to S.
KEARNEY	Ranch field—5 mi. S.—mi. square—across white stone bridge—across Platte river—E. of road—good wet—alt. 1900 ft.—pop. 10,000.
KEARNEY	Kearney field—1½ mi. E.—on Lincoln highway—near academy—hangar.
LEXINGTON	Ideal field—along road—W. of cemetery—2640×800 ft.—house at S. and N. ends—good wet—alt. 1800 ft.
LINCOLN	Aero Club of Lincoln.
LINCOLN	Nebraska Aircraft Corp. field—3 mi. E.—380 acres—hangars and supplies for Lincoln Standard airplanes.
LINCOLN	Harding, Zook and Bahl (Goodyear) Aero service.
LOUP CITY	Lenninger pasture—1½ mi. N.E.—800 acres—along Loup river.
NEBRASKA CITY	Schreiter's pasture—5½ mi. W.—12 acres fenced—soft if wet—along road—good open fields—between here and old fair ground field which is 1½ mi. S.W. of city.
NORTH PLATTE	Pawnee Ranch field—3 mi. out—1200 acres—along So. Platte river—near bridge—½ mi. S. of stockyards—along road—ideal—supplies—alt. 2800 ft.

Municipal Field, North Platte, Nebraska.

Ogallala	Searle Aero Co. field—3 mi. W.—between Sand hills and R.R.—on N. side of river—80 acres square—1 mi. W. fair grounds—hangar and circle—good wet—supplies.
Omaha	Aero Club of Nebraska.
Omaha	Ashmusen Aeronautical Company—aeroplanes and motors.
Omaha	Omaha Fort-Balloon School and U. S. Hydrogen Plant.
Omaha	Municipal (AK-SAR-BEN) field—3½ mi. S.W.—130 acres—ideal—large hangar—aerial mail field—all service and supplies on field by Ashmusen Aero Company. alt. 1400 ft.—pop. 100,000.
Potter	Emergency field—about 1 mi. W. on N. side of tracks.
Saint Paul	St. Paul field—2 mi. N.—160 acres—S. of river—mark circle—good wet—Trans.-Cont. Races top—alt. 1400.
Sidney	Municipal field—3 mi. N.—400 acres—S. of sand hills—along C.,B. and I.R.R.—2 sheds S. end—Trans. Cont. Race stop—¾ mi. S.E.—round house and water tower—X in circle—alt. 4120 ft.—pop. 3000.
Valentine	Municipal field—S.E.—1320 ft. square—E. of fair grounds—good wet—alt. 2585 ft.—pop. 1650.
Wahoo	Municipal (Berggren) field—1 mi. S.E.—1300×2600 ft. E. of wooded stream and cemetery—good wet—alt. 1000 ft.—pop. 2500.
York	Gibbon field—1 mi. S.E.—80 acres—near R.R.—C. club grounds to S. as emergency, but object to landing.

AIRWAYS THROUGH NEBRASKA

Omaha to Central City, plenty of open fields.
Central City to Grand Islands, plenty of open fields.
Grand Islands to North Platte, plenty of open fields.
North Platte to Ogallala, plenty of open fields.
Ogallala to Sidney, by way of Julesburg, plenty of fields.
Sidney to Cheyenne, Wyoming, plenty of open fields and landing at Fort Russell, a first class field.

A "Movie" Airview of Aksarben Field, Omaha, Nebraska.

CITIES

NEVADA

Battle Mountain...Municipal field—Trans-continental Race stop—also race track to S.W.—which is good landing.

Carson City....Emergency field—listed by U. S. Air Service.

Elko...........Municipal field—1100×600 ft.—½ mi. S.E.—N. side of R. Ry.—marker—good wet—garage—alt. 5028 ft.—pop. 3500.

Fallon.........Emergency field—Lake bed—10560×7920 ft.

Humboldt Lake Lake is dry and landing could be made, but awful country.

Lovelock.......Emergency field—listed by U. S. Air Service.

Montello......Municipal field—old ball ground and straight race course—to E. of town—gas and oil—surrounding country good—alt. 4875 ft.—pop. 400.

Reno...........Fair ground field—2000 ft. oval—1¼ mi. N.E.—good wet—supplies by Nevada Aviation Corp.—alt. 4400 ft.—pop. 18,000—air mail field.

Winnemucca....Municipal field—1800 ft. square—¾ mi. E.—to be marked—elec. wires 200 yds. S.W.—part field—good wet—Stan. oil—alt. 4200 ft.—pop. 2500.

NEW HAMPSHIRE

CITIES

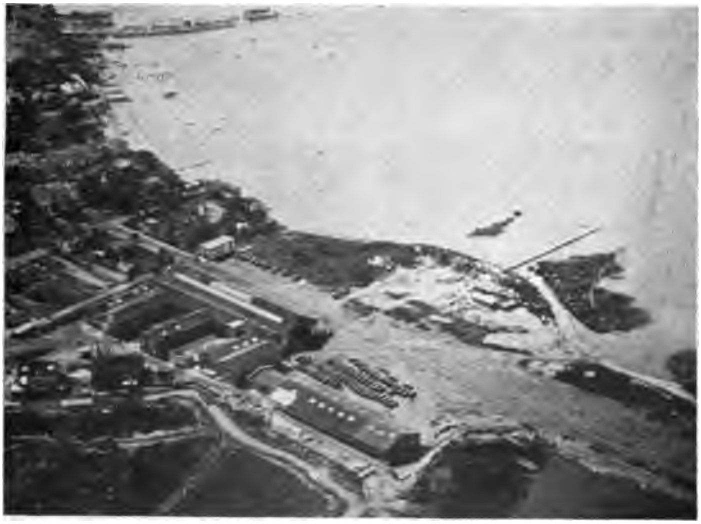
Lancaster......Holton-Municipal field—1500×1000 ft.—½ mi. N.W.—pond to W.—river N.W.—house at S.E. end field—good wet—oil and gas.—alt. 700 ft.—pop. 3000.

Manchester....Country Club field—on golf course—5 mi. out—100 acres—was used by Army.

Curtiss Flying Station, Atlantic City, N. J.

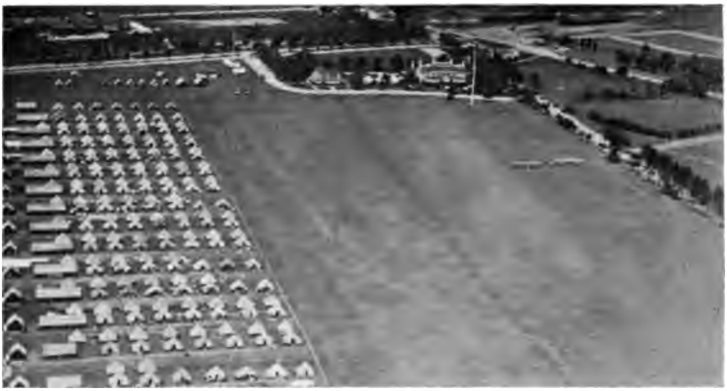
NEW JERSEY

CITIES	
Asbury Park	Municipal golf links field—1200×600 ft.—18 acres—along road—club house and shed in field, used by Ralph Morgan.
Atlantic City	Aero Club of Atlantic City.
Atlantic City	Airport field—2 hangars—triangular—good near houses, rest danger—good wet—corner Main blvd. and water thoroughfare—Curtiss agency and supplies.
Atlantic City	Curtiss Seaplane station—at inlet—hangar and service.
Atlantic City	Emergency field—at C. club where D H. 4 has landed.
Cape May	Naval Aircraft station—seaplanes only—hydrogen plant.
Dover	Eagle Flying Corp. field—1800 ft. square—3 mi. W.—E. of R.R. crossing—red hangar on W.—N. and S.—good wet—mine shaft N.E. side—alt. 600 ft.—pop. 10,000.
Elizabeth	Emergency field.
Hackensack	Aero Club of New Jersey.
Hasbrouck Heights	Whitteman-Lewis Air Corp. and field—7 mi. W. of N.Y. city—800 acres—being prepared—for seaplanes also—along Small river.
Keyport	Aeromarine Plane and Motor Co. field—1800×600 ft.—letters on roof—service and supplies—S. side lower bay—seaplane station also.



Aeromarine Factory, Landing Field and Flying Boat Station at Keyport, N. J.

LAKEHURST	Army and Navy Balloon Base—Emerg. field—4 mi. S. or E. of Toms river.
NEW BRUNSWICK	Underhill field—passenger carrying—hangars.
NEWARK	Hellar field—47 acres—6 mi. N.W. of city—near canal and R.R. junction—cinder runways—formerly mail field.
NEWTON	Emergency field.
PATERSON	Wright Aeronautical Corp.—Wright Hispano engine.
PERTH AMBOY	Garretson field—1800×600 ft.—1½ mi. N.—W. of 12 oil tanks—hangar N.E. corner—circle—garage—W. of lower bay at rivers' junction—pop. 55,000.
PINE VALLEY	Curtiss Flying field—3600×4200 ft.—15 mi. S.E.—Camden—near small lake—2 hangars—supplies—Curtiss Eastern Airplane Co.
POMPTON LAKES	Murchios Airdrome—commercial.
PRINCETON	Princeton Un. Aero Club.
PRINCETON	Princeton Flying Club and School field—1500×900 ft. —2 mi. S.W.—wooden hangar—good wet—garage—alt. 200 ft.—pop. 7500 ft.
RIDGEWOOD	Rouclere field—commercial—passenger carrying.
SEAGIRT	Camp Edwards field—5000×2000 ft.—along ocean—between barracks and road—very good—pop. 1000.
SPRING LAKE	Emergency field—along coast and W. of bridge crossing inlet—barn along road in field—commercial.
WRIGHTSTOWN	Emergency field—Camp Dix—15 mi. S.E. Trenton—West Point Cadets in training.



(Fairchild Aerial Camera Corp., Photo.)

Camp Edwards Field, Seagirt, N. J.

NEW MEXICO

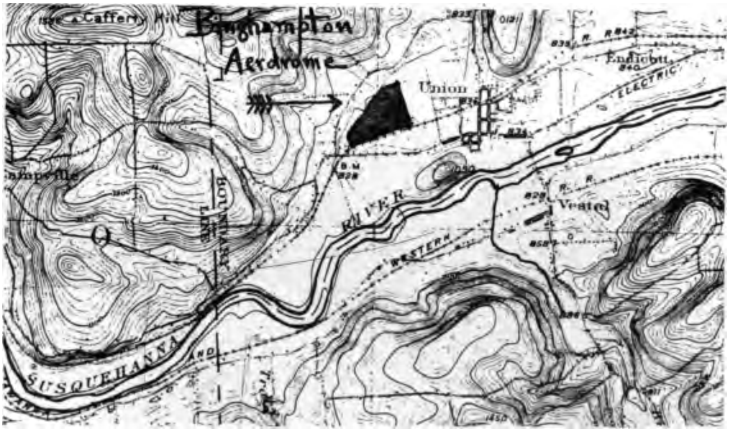
CITIES	
Albuquerque	Commercial Flying field and school.
Almagordo	Municipal field.
Calsbad	Emergency field—listed by U. S. Air Service.
Cerrillos	Municipal field—listed by U. S. Air Service—ball park.
Chapelle	Emergency field—listed by U. S. Air Service.
Clayton	Emergency field—listed by U. S. Air Service.
Columbus	Camp Fourlong drill field—to E.—S. of R.R.—1 mi. square—now used by U. S. Air Ser.—6 mi. N. of lake in Mexico—alt. 4000 ft.—pop. 2400—marked—two way landing—W. wind prevails.
Deming	Camp Cody—Army Post—ideal field on race-track.
Des Moines	Emergency field—listed by U. S. Air Service.
Gallup	Emergency field—listed by U. S. Air Service.
Garcia Ranch	Near Border Monument No. 67—good field with four way approach.
Hachita	Ideal field—properly marked—approach from any direction.
Lordsburg	Municipal field—½ mi. S.E.—mark "T"—½ mi. S. of S. P. R.R. track—good wet—alt. 4300 ft.—pop. 1500 ft.
Las Vegas	Storris field—1 mi. E.—¾ mi. square—along road—good wet—ideal—test gas—alt. 6383 ft.—pop. 11,000.
Onava	Emergency field—listed by U. S. Air Service.
Optimo	Emergency field—listed by U. S. Air Service.
Santa Fe	Municipal field—3 mi. S.—18,000×15,000 ft.—U. S. Indian school—½ mi. N.—good wet—Army used—alt. 6900 ft.—pop. 11,000.
Shoemaker	Emergency field—listed by U. S. Air Service.
Taiban	Municipal (Speight) field—listed by U. S. Air Service.
Texico	Municipal (Hamlin) field—listed by U. S. Air Service.
Tucumcari	Emergency field—listed by U. S. Air Service.
Wagon Mound	Emergency field—listed by U. S. Air Service.
Willard	Municipal (Torres) field—listed by U. S. Air Service.

(*Fairchild Aerial Camera Corp., Photo.*)

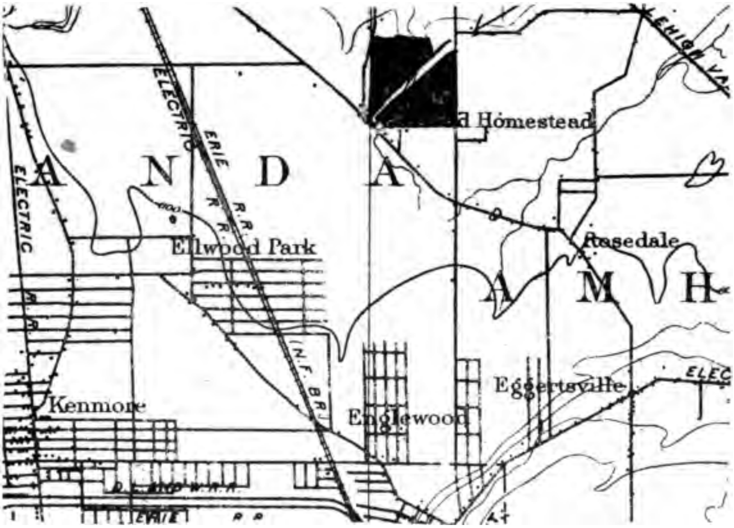
Smith Field at Spring Lake, N. J.

NEW YORK

CITIES	
Albany	Municipal (Roosevelt Memorial) field—1½ mi. S.E. on Van Rensselaer Island—1 mi.×½ mi.—S. of white oil tanks—fuel.
Au Sable Forks	Emergency field—listed by U. S. Air Service.
Batavia	Emergency field—fair grounds—bad.
Binghamton	De Forrest field—8 mi. W.—along river—1200×600 ft.
Birdsell	Emergency field—N.W. of town—1200×300 ft.—good fields around.
Brooklyn	See New York City list.
Buffalo	Aero Club of Buffalo.
Buffalo	Curtiss Aeroplane and Motor Corp. field—7 mi. N.E.—3950×900 ft.—between blvd. and R.R. to Niagara Falls—2 hangars—runways—mark—service and supplies—alt. 540 ft.—pop. 450,000.
Buffalo	Blasdell Emergency field—along Lake av.—1200×300 ft.—near R.R.
Canton	Fair grounds—½ mi. N.W.—good—½ mi. track.
Devon	Emergency field—good fields around.
Dunkirk	Days Meadow—1 mi. S.—2000×300 ft.—along street—¾ mi. S. Penn. R.R.—alt. 648 ft.—pop. 20,000—good wet—ideal.
Geneseo	Emergency field—2 mi. N.—1500×1800 ft.—good—phone Cham. of C. Mr. Euchner—pop. 4000.
Glens Falls	Municipal (Millards farm) field—3 mi. N.W.—along road—3000 ft. square—"T" mark—S.E. corner—good wet—test gas—alt. 700 ft.—pop. 30,000.
Goshen	Gragary Farm field—near town—50 acres square—ideal.



Hammondsport	Aerial Service Corp. field—also The Airship Manufacturing Co.—service and supplies to all machines and motors.
Ithaca	Municipal field—surrounded by Cayuga Lake, canal and R.R.—1800×2600 ft.—3 good runways—hangar N.W. corner.
Ithaca	Thomas-Morse Aircraft Corp. Service—supplies and field. Aero Club of Cornell University.
Jay	Straight Farm field—3 mi. out—1500 ft. ×3 mi. long—along road—few farm houses and wire fences across—good—Woods E. and W.
Keeseville	Emergency (Ball Park) field—360×800 ft.—grandstand S. end—emergency hay field across rd. and river to N.
Lake Placid	Municipal field—2½ mi. out—across ravine from golf course—1425×1350 ft.—ideal—test gas—alt. 2000 ft.
Liberty	Gregory Farm field—1 mi. W.—700×1100 ft.—¼ mi. N. of small woods—few trees W.—ideal in hilly country.
Little Falls	Smith Farm field—3 mi. W.—600×1000 ft.—between R.R. and Mohawk river—near C. club—"T" mark—good.
Long Island	Long Island facilities follow New York State.
Lowville	Berkler Farm field—1 mi. N.E.—350×700 ft.—farm house in N.E. corner—roads on two sides—field near N.Y.C. R.R.
Millerton	Millerton Aviation field—1800×350 ft. emergency.



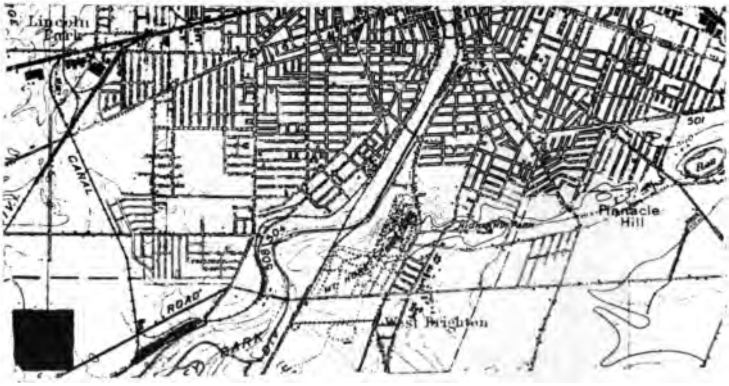
Curtiss Field, Buffalo, New York.

New York City's Aerial Parade During Opening of the Municipal Float for Flying Boats at 86th Street and Hudson River.

New York City

Aero Club of America—11 East 38th st.—club house.
Aero Import Corporation—S.V.A. Aeroplanes.
Aero Limited Flying Boat Passenger Service.
Aerial Age Weekly (pub. weekly).
Aeromarine Plane & Motor Co.—Flying Boats.
Aircraft Materials and Equipment Corp.—Supplies.
America Trans-Oceanic Co.—Curtiss dis.—N. Y. City and Florida.
Aviation and Aircraft Journal (pub. weekly).
Bristol Aeroplane Co., Ltd.—Bristol Aeroplanes.
Cantilever Aero Company.
Curtiss Aeroplane and Motor Corporation—Aeroplanes.
Curtiss-New York Aircraft Corp.—N.Y. State Dist.
Flying (published monthly).
Gallaudet Aircraft Corporation—Aeroplanes.
Horace Keane Aero Planes Inc.—The Ace.
Interallied Aircraft Corporation—Avro.
Farman Aeroplanes (W. Wallace Kellett).
J. L. Aircraft Corporation—All metal monoplane.
Lawrence Aero-Engine Corporation.
Lewis and Vought Corporation—Vought aeroplanes.
Loening Aeronautical Engineering Corp.—Monoplanes.
Ordnance Engineering Corporation—Orenco aeroplanes.
United Aircraft Engineering Corporation—aircraft.
Municipal Seaplane Float—82nd st. and Hudson river.
Municipal Seaplane Float—Fort Hamilton, Brooklyn—3 hangars.
Commercial Landing fields—see Long Island list.
Municipal fields—New York City Aerial Police only.
Brooklyn Parade grounds along Prospect Park.
Central Park—Sheep meadows—public playground.
Fort Hamilton, Brooklyn—seaplane float and 3 hangars.
Gallatin field—130th st.—on filled-in Hudson river bank.
Governor's Island—south of Manhattan.
Van Cortlandt Park—public playground.

NIAGARA FALLS	Municipal field—along Sugar st., near end of Pierce av., 1800×1800 ft.—ideal—hangar and marker to be.
NIAGARA FALLS	Niagara Aircraft Co., Inc., field—along Niag. Blvd.—near old C. club—1800×2400 ft.—ideal—buildings in corner.
ONEIDA	Municipal field—1 mi. S.—550×1000 ft.—between roads along N.Y.C.R.R.—State troop bldgs in field—good wet—alt. 300 ft.—pop. 12,000.
ONEIDA	Country club field—1 mi. S.W.—350×660 ft.—land across course.
OSWEGO	Fort Ontario Drill grounds—½ mi. N.—2000×900 ft.—drive way all around—ideal—500 ft. from lake.
PLATTSBURG	Barracks Parade grounds—700×2200 ft.—between bldgs.
PORT JERVIS	Municipal field to be—3 mi. out on Neversink road.
POUGHKEEPSIE	Private driving track—emerg. only—830×2500 ft.—in 1 mi. oval track—rough—owner objects to landings.
ROCHESTER	Aero Club of Rochester.
ROCHESTER	Municipal field—3 mi. S.W.—along road—2653×1800 ft.—¼ mi. from Gen. river—ideal—hangar—alt. 525 ft.
ROCHESTER	Northeast Air. Corp. field—3 mi. S.W.—near water tank—hangar.
ROCHESTER	Rochester Aircraft Corp.—Flying Boat trips over Lake.



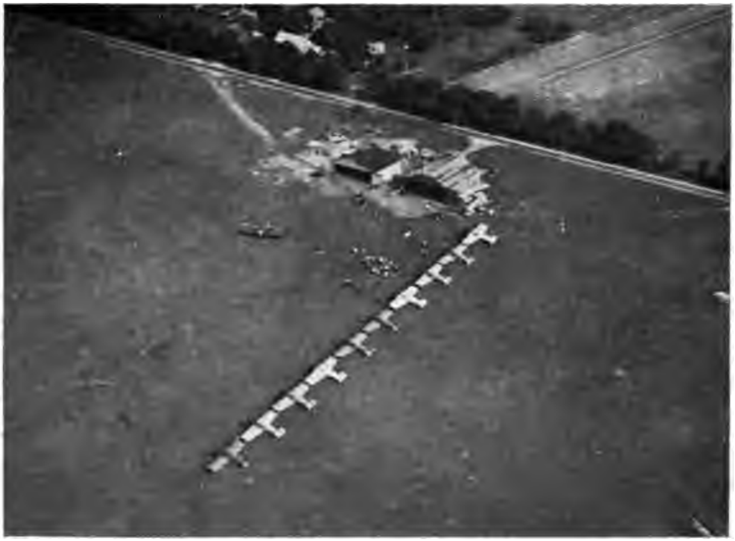
Location of Rochester Field.

SARANAC LAKE	Mannix field—1½ mi. N.E.—in race track—500×1000 ft.
SCHENECTADY	Municipal field—1200×1800 ft.—along rd.—B. and M. R.R. on S. side—orchard and farm bldgs. on N. side—ideal—Y 63.
SILVER CREEK	Good emergency fields—between strips of forest.
STATEN ISLAND	New Dorp Govn. Coast Defense Station—Miller field—1700×4000 ft.—ideal—seaplane station also—emergency only for civilian planes—on South New York bay—marked N.D.
STATEN ISLAND	Oakwood Heights—emergency field.
SYRACUSE	Aero Club of Syracuse.
SYRACUSE	Bethka field—1 mi. N. of rd.—between Syra. and E. Syra.—560×1160 ft.—hangar and mark—good.
SYRACUSE	Syracuse Aero Corporation—commercial flying.
SYLVAN BEACH	Municipal field—Edmont Genet Memorial.
TARRYTOWN	Emergency field—4 miles out—east view.
TUPPER LAKE	Osley Farm field—1½ mi. N.E.—500×1500 ft.—good—along rd.—fenced—barn in next field.
UNION	Endicott-Johnson field—1¼ mi. W.—10½ mi. W. of Binghamton—800×1900 ft.—between creek and R.R.—R.R. platform in field—ideal.
UTICA	Municipal field—S.E.—between blvd and ave.—800×1200 ft.—hangar across rd. from large barn—good.
WATERLOO	Thomas field—1 mi. S.W.—1120×1176 ft.—surrounded by roads and row of trees—9 houses to N. and 6 to N.E.
WESTFIELD	Peacock Emergency field—near town—along rd—400×1500 ft.—house and barn at N. end—also field near light house—600×300 ft.

Modern Facilities at Port Washington, L. I., N. Y.

LONG ISLAND

CITIES	
AMITYVILLE	(Proposed New York Airdrome) formerly Sperry field—2½ mi. E. along Merrick road—hangar in corner—house in center—land along road or runway towards house.
BABYLON	Emergency field—good—old Govn., Damm, Field.
BALDWIN	Ordnance Engineering Corporation—Orenco factory.
BAYSHORE	Emergency field and old U. S. Naval Air station.
BELMONT PARK	Emergency field—ideal—mi. track—4 mi. N.E. Jamaica
CENTRAL PARK	J. L. Aircraft Corp. field—2 mi. S.W.—600×2000 ft.—along rd.—hangars and gas shed—land N. and S.
CENTRAL PARK	L. W. F. Eng. Corp. field—¼ mi. W. from above field—1000×2500 ft.—ideal—gas house and floor of hangar.
COLLEGE POINT	L. W. F. Eng. Corporation—aeroplane factory.
COMMACK	Emergency field—good—old Govn., Brindley field.
EAST HAMPTON	Emergency field.
FARMINGDALE	Sperry Instruments Inc.—Aircraft instruments.
FARMINGDALE	Emergency Field—¼ mi. S. along Road and aside long low Factory—land on Runways.
FLUSHING	Aëro Limited Flying Boat station—trips along coast.
GARDEN CITY	Mitchell field—3000 ft. square—Active Air Service field—row of hangars—Curtiss Airport and Roosevelt fields are ¼ mi. N. and ideal fields.



J. L. Aircraft Corporation Field, Central Park, Long Island, N. Y.

GARDEN CITY	Curtiss Aeroplane and Motor Corporation—factory and supplies. Curtiss Airport along rd.—row of hangars E. and S.—water tower along rd. on S. side—service and supplies—now U. S. Aerial Mail field—old Govn. Hazelhurst field—2500 ft. square. This with Mitchell and Roosevelt fields adjoining, and others near, make it the Aviation center of the east.
GARDEN CITY	U. S. Atlantic Fleet Shipplane Division at Mitchell field.
GRAVESEND BAY	Fair grounds—near Coney Island—ideal mi. track.
MONTAUK POINT	Fort Pond Bay—ideal emergency field—unlimited area of firm sodded sand—old Govn. seaplane base.
PLUM ISLAND	Fort Terry parade grounds—across the L. I. Sound—N.E. is Fishers Island and then the Connecticut Shore—475×1050 ft.—ideal.
PORT WASHINGTON	America Trans-Oceanic Co.—flying boats—hangars.
SAYVILLE	Emergency field—Sayville Wireless Towers near.
ROCKAWAY	U. S. Naval Air station and blimp hangars.
SMITH POINT	Emergency field.
SOUTHAMPTON	Emergency field—near beach—also West Hampton.
UPTON	Emergency field—Old Camp Upton Parade grounds.
WANTAGH	Emergency field—ideal—½ mi. S.—Old Govn. Lufberry field—along Merrick road—roadway runs N. and S.
WESTBURY	Roosevelt field—the best on Long Island—1 mi. S.W.—3000 ft. square—along rd.—4 hangars and bldgs.
WOODBURY	Emergency field—ideal—Old Govn. Webb field.

Curtiss Airport, Garden City, L. I., New York.

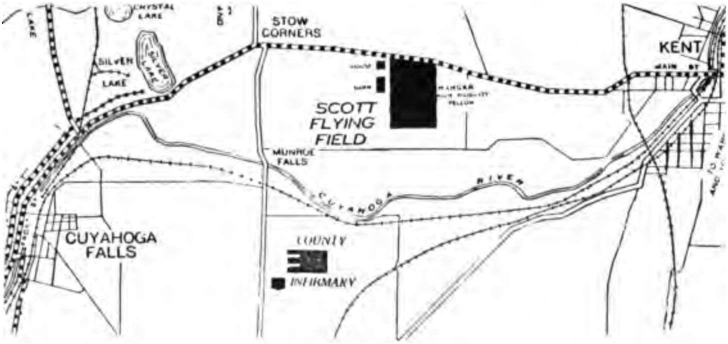
NORTH CAROLINA

CITIES	
Asheville	Emergency field—Biltmore estate.
Charlotte	Municipal field—ideal—hangar and gas—Southern Aeroplane Co.—½ mile S. of race track—good field.
Danville	Emergency fields on hilltop.
Dunn	Emergency field—race track.
Fayetteville	Pope field—Camp Bragg—good—D.H. 4 field—10 mi. W. of Fayetteville and equipped with fine hangars.
Goldsboro	Municipal (Borden) field—to N.E.—300×1200 ft.—trees on W. side—corn field E.—2 blocks from car line.
Goldsboro	Emergency field—race-track—300×500 ft.—fair—ditch.
Greensboro	Swain Farm field—7 mi. W.—¾ mi. W. of Gilford College—S. side of R.R. and road to Winston-Salem—700×800 ft.—fair.
Greensboro	Cobbs Farm field—7 mi. out along rd. to High Point.—950×200 ft.—between Woods on W. and rd. on E.—alt. 875—pop. 35,000.
Hamlet	Emergency fields in open country around.
Hobgood	Emergency fields in open country around.
Kinston	Hill field—4 mi. W.—500×1000 ft. S. of R.R.—N. of river and rd.—pop. 7000.
Morehead City	Camp Glenn—Coast Guard Seaplane station and State Camp grounds for emergency landing field.
Newbern	Acme Film Co. field—to W.—S. of RR.—150×700 ft.—Acme on roof of pavilion to N.—good wet—alt. 20 ft.—pop. 10,000.
Pinehurst	Municipal (Tufts) field—1 mi. S.W.—1000 ft. square—near Diary farm—ideal—hangar—good wet—alt. 650 ft.—pop. 3000.
Raleigh	Municipal field—1 mi. S.E.—1200×150 ft.—½ mi. from ball park—"T" mark—use runway—alt. 363 ft.—pop. 26,000.
Wilmington	Municipal field—3 mi. S.—along car line—900 ft. square—near old Marine hospital—¾ mi. S.E. of C. club—fairly good.
Wilson	Emergency field—listed by U. S. Air Service.
Winston Salem 35 acres square	Maynard field—6½ mi. S.E. on rd. to Greensboro—ideal—gas sta. on rd. by field—alt. 1500 ft.—pop. 35,000—good wet—marked—service by Winston-Salem Aviation Co.

(Please note new fields and mail to author.)

NORTH DAKOTA

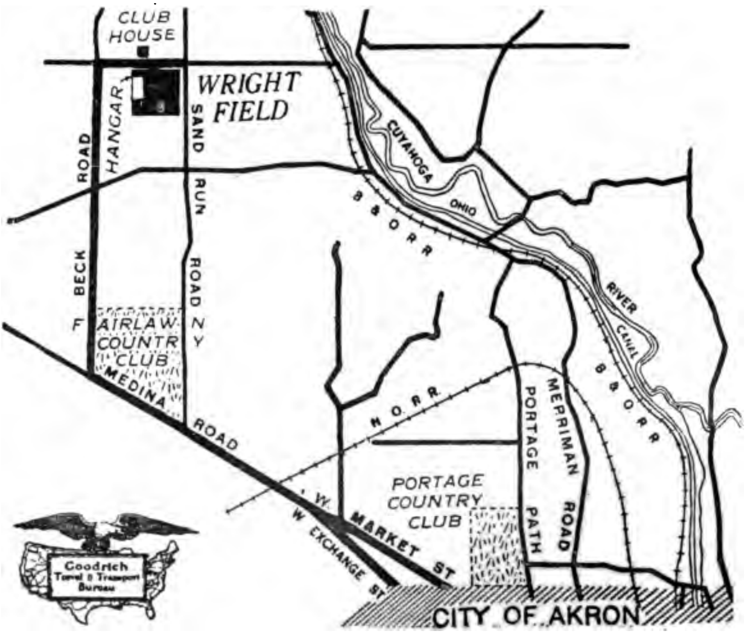
CITIES	
Bismarck	Fort Lincoln—Govn. reservation—good field—possible fields on plateau.
Dickinson	Several good fields a few miles West.
Eagles Nest	Emergency field—listed by U. S. Air Service.
Eldridge	Emergency field.
Fargo	Fargo Interstate Aircraft Corp. field—commercial fiying.
Fort Lincoln	Army Post (abandoned).
Glen Ullin	Emergency field—listed by U. S. Air Service.
Grand Forks	Emergency field—listed by U. S. Air Service.
Hobart	Emergency field—listed by U. S. Air Service.
Jamestown	Emergency field—listed by U. S. Air Service.
Judson	Emergency field—listed by U. S. Air Service.
Lewis	Emergency field—listed by U. S. Air Service.
Mandan	Emergency field—listed by U. S. Air Service.
Minot	Hedgins field—2 mi. W.—½×¼ mi.—along tel. wires—N. of river and R.R.—hangar and "T"—Lt. Jacobsen operates here—ideal field—alt. 1600 ft.—pop. 12,000.
Sedalia	Emergency field—listed by U. S. Air Service.
Sims	Emergency field—listed by U. S. Air Service.
Sunny	Emergency field—listed by U. S. Air Service.
Sweet Briar	Emergency field—listed by U. S. Air Service.
Valley City	Emergency field—1 mi. W. on high land—good.
Williston	Emergency field—listed by U. S. Air Service.



Location of Scott Field, Akron, Ohio.

OHIO

CITIES	
AKRON	Akron Flying Club—Walsh Block.
AKRON	Scott field—6 mi. N.E.—1½ mi. E. of 2 lakes—hangar and service by Ohio Flying School and Transport Co.
AKRON	Wright field—5 mi. N.W.—¾ mi. W. of canal and river—near C. club—1200×1300 ft.—hangar—Akron Flying Club.
AKRON	Govn. Balloon Hangar and Hydrogen plant—650 acres—
AKRON	The Goodyear Tire and Rubber Company.
ALLIANCE	Country Club emergency field.
ARCANUM	Miami Valley Air Co. field and flying school.
BOWLING GREEN	Simons Farm field—1 mi. N.—along rd.—400×1500 ft.—ideal—E. end between bldg—along Air Mail route.
BRYAN	U. S. Mail field—1 mi. out—¼ mi. N. of N.Y.C. RR.—600×1050 ft.—ideal—Cinder Cross in center of field—hangar.
CANTON	Real Estate Co. field—W. limits—800×1500 ft.—good—Myers lake—1 mi. N.—field is bordered by streets.
CEDAR POINT	Emergency field—very good.
CINCINNATI	Cincinnati Aero Club.
CINCINNATI	Cincinnati Aircraft Co.—Farman aeroplanes distributor.



Cincinnati......Aviation park—7 mi. N.E.—along rd.—near cemetery—2600×2900 ft.—ideal—hangar and "T" to be—orchard in field on rd. to E.—alt. 600 ft.

Cleveland......Cleveland Aviation Club—Hotel Statler.

Cleveland......Glenn L. Martin Company—aeroplane factory and field. Used by U. S. Aerial Mail—10 mi. E.—near lake between trolley line and R.R.—1500×3300 ft.—land on runway E. and W.—mail hangar in S.W. corner near smoke stack—alt. 686 ft.—pop. 560,000.

Cleveland......Cleveland Av. Club field—6 mi. S.E.—along Kinsman rd. and car line—S. of cemetery—W. of G. club—2200 ft. square—good.

Cleveland......Logan Aviation Company—Curtiss distributor.

Cleveland......U. S. Aerial Express Co.—flying boat service.

Cleveland......Aircraft Disposal Corporation—British distributor.

Cleveland......G. H. McClelland—Continental Aircraft Inc., distributor.

Columbus.......Aero Club of Columbus—Hotel Deshler.

Columbus.......Ohio State University field—N.W.—near Scioto river—1500×1800 ft.

Columbus.......Ohio State University field—as seen from the air cross mark—soft if wet—college bldgs. on E. side.

Coshocton......Rickets Farm field to S.—between Musk. river and Penn. R.R.—3000×5000 ft.—soft if wet—on Concrete rd.—alt. 100 ft.—pop. 12,000.

Aerial Mail Hangar and Cinder Runway at Glen L. Martin Field, Cleveland, Ohio.

Dayton	Aero Club of Dayton—613 N. Main street.
Dayton	Dayton-Wright Division of General Motors—aeroplanes.
Dayton	Miller Aeroplane Co.—parts and E. M. Johnson, Curtiss distributor.
Dayton	McCook field—Govn.—experimental fctory—to N.
Dayton	South field to S.—along rd. and car line—1800×1500 ft.—7 hangars and mark on field—supplies by Dayton-Wright Aeroplane Co.
Fairfield	Wilbur Wright field—N.E. of Dayton—Air Service depot.
Findlay	Emergency field—1½ mi. S.—near old fair grounds—1000×1300 ft.—ideal.
Findlay	½ mi. track—1 mi. E. at new fair grounds—800×600—good.
Fremont	Christy Farm field—1½ mi. N.W.—700×1200 ft.—ideal fields around.
Hamilton	Emergency field—fair grounds.
Ironton	Rafusa Flyers Inc. field and flying instructions.
Kenton	Emergency field—fair grounds—½ mi. track.
Lorain	Woodruff Farm field—4 mi. E.—2000×2400 ft.—ideal—between R.R.—supplies by Weaner Aircraft Company.
London	London Aero Club, Inc. field—¾ mi. S.—1500 ft. square—hangar S.W.
Mansfield	Aero Club of Mansfield.
Mansfield	Mansfield Air Service Co. field—1 mi. W. by rd.—20 acres—hangar in W. corner—service—alt. 1492 ft.—pop. 30,000.
Newark	Wehole Farm field—S.W.—near fair grounds—830×1020 ft.—good—along rd. and trolley line—open fields around—also C. club.

(*U. S. Air Service Photo.*)

The Ohio State University Field, Columbus, Ohio.

Piqua	Hartzell Propeller Company—emergency field to S.
Ravenna	Willard Brady field—W. follow car line—W. to bend—fly N.W.—field to right past second house—750×1200 ft.—alt. 1140 ft.—pop. 7200.
Sandusky	Emergency Farm field—to E.—near bay—1000×1200 ft.—Lake Erie N.
Springfield	Sturgeon field S.W.—along rd.—2000×2500 ft.—ideal—wires.
Steubenville	Emergency field—C. club—1800×300 ft.
Toledo	Toledo Flying Club—326 Ontario street.
Toledo	Municipal (Bay View Park) field—near Lake Erie and Maumee River—2000×2500 ft.—ideal—club house E. end—car line W.
Toledo	Blanchard Aviation School—Bay View Park field.
Warren	Municipal (Packard Park) field—1 mi. E.—1500×1800 ft.—public playground—emergency only—Mahoning River on W.—bldgs on E.
Youngstown	Youngstown Aviation Club.
Youngstown	Olds Farm field—5 mi. S.W.—between orchard, rd. and trolley line—1400×1600 ft.—ideal—near C. club.
Zanesville	Emergency field—3 mi. N.E.—near rd.—900×650 ft.—also ½ mi. track.

(U. S. Air Service Photo.)

Coschocton, Ohio.

OKLAHOMA

CITIES	
Ada	Barringer field—1 mi. S.W.—about 6 acres square—emergency—also Novi's meadow—300×1000 ft.—alt. 1000 ft.—pop. 12,000.
Altus	Emergency field—S.W.—edge of town beyond R.R.—running N. and S.—80 acres square—ideal—wheat stubble—alt. 1500 ft.—pop. 7000.
Alva	Emergency wheat field—1 mi. E.—80 acres—alt. 1330 ft.
Anadarko	Fair grounds track—500×1000 ft.—good—alt. 1100 ft.
Arapaho	Black farm field—¼ mi. E.—350×1000 ft.—good—alt. 1500 ft.—pop. 1000.
Ardmore	Emergency field—country club grounds.
Atoka	Municipal City water shed—N. of M.K. and T. R.R.—100 acres—good wet—ideal rolling meadows—alt. 600 ft.—pop. 3000.
Chandler	Rifle Range field—on W. edge—3000×900 ft.—trees on S.—ideal—also city park field near—alt. 900 ft.—pop. 3000.
Cherokee	Bradley field—S.E.—edge bounded on E. by Sante Fe R.R.—500×1000 ft.—good—fenced—test gas—alt. 1200.
Blackwell	Emergency field—race-track—450×1350 ft.
Blanchard	Emergency field—Davis field—500×1000 ft.
Clarimore	Emergency field—½ mi. race track.
Clinton	North School bldg field—N.W. part—40 acres—ideal—fenced pasture—good wet—alt. 1600 ft.—pop. 4000.
Cordell	Moslander emergency field—½×¼ mi.
Drumright	Cook's Aviation field—900×300 ft.—emergency.
Duncan	Taliaferro field—1 mi. S.W.—½ mi. W. of R. Is. R.R.—½ mi. E.—city cemetery—1200×2000 ft.—ideal—"T" on barn—alt. 1125 ft.—pop. 5000.
El Reno	Emergency field to W.—between city and C. club—48 acres square—soft if wet—small fences and roads—alt. 1357 ft.—pop. 10,000.
Enid	Municipal field—2 mi. E.—40 acres square—fenced—hangar—good wet—alt. 1244 ft.—pop. 17,000.
Erick	Erick Aviation Company—Lincoln Standard planes and Hispano motors.
Fairview	Fair grounds—½ mi. track—ideal—25 acres—free from fences—runs E. and W.—alt. 1317 ft.—pop. 2000.
Fort Sill	Post field—2 mi. N. of Lawton—Active Air Service field.
Frederick	Municipal field—½ mi. E.—60 acres—land on N. edge—fence around creek on N. and E. sides—alt. 1000 ft.
Guthrie	Municipal field—1 mi. S.—580 ft. square—fenced—wires on S. and E.—good wet—prairie meadow—alt. 900 ft.—pop. 15,000.
Henryetta	West Henryetta—Curbert (Commercial Club field)—1 mi. W. on rd.—1320 ft. square—fenced—ideal—alt. 700 ft.
Hobart	Municipal (Raymond Goodson) field—600×4000 ft.
Holdenville	Municipal (Southside park) field—¾ mi. S. of R. I. R.R. and ¼ mi. E. of Frisco R.R.—cross mark—1500×600 ft. oval—ideal—alt. 900 ft.—pop. 4500.

Lawton	Government Post field at Fort Sill.
McAlester	(Penitentiary) field—2 mi. N.E.—400 ft. square—circle mark—also good field in ½ mi. race track—alt. 750 ft.—pop. 18,504.
McLand	Municipal (McGray field)—600×100 ft.
Medford	Grand Amusement Co. field—½ mi. W.—1200 ft. square—ideal—race-track at fair grounds—alt. 1300 ft.—pop. 2000.
Muskogee	Fair grounds—½ mi. track—1 mi. S.E.—good wet—alt. 600 ft.—pop. 45,000.
Newkirk	Stowking pasture field—½ mi. W. of R.R. at S. of town—ideal—ditch S. and W. ends—800×1200 ft.—alt. 1124.
Oklahoma City	Municipal field—4½ mi. S.—1320×2640 ft.—near Dairy farm—supplies by Arbon Aircraft Corp.—alt. 1275 ft.—pop. 111,000.
Okmulgee	Creek (Colt) field—1½ mi. N.E.—½ mi.×¼ mi.—ideal—hangar and service by Creek Airplane Co.—alt. 600 ft.—pop. 25,000.
Ponca City	Ponca (Nonnamaker) field—40 acres of meadow—good wet—service by Ponca City Aerial Trans. Co.—alt 1000 ft.—pop. 9000.
Sapulpa	Southern Heights field—½ mi. from R.R.—open grounds also race track—14 mi. N.E. of Tulsa, Okla—alt. 712 ft.
Shawnee	Shawnee field—2½ mi. N.W.—near Universities—1680 ft. square—good wet—fenced—alt. 1008 ft.—pop. 25,000.
Stigler	Municipal field—¼ mi. N.E.—1200 ft. square—¼ mi. from R.R. at fair grounds—good wet—alt. 600 ft.
Stillwater	State owned (Whitehurst) field—2000 ft. W. of A. and M. College—½ mi. square—cross mark—good wet—alt. 1000 ft.—pop. 8000.
Texola	Municipal (Watson) field.
Tishomingo	Fair ground race-track field—400×1000 ft.
Tulsa	Arbon-Bristol Aeroplane Co.—Bristol Aeroplane dist-
Tulsa	Tulsa Air Station—3 mi. E.—220 acres—ideal—2 hangars—marked—service and supplies by Arbon-Bristol Aeroplane Co.—alt. 1100 ft.—pop. 100,000.
Tulsa	Curtiss-Southwest Airplane Company—Curtiss dist.
Tulsa	Curtiss field—6 mi N.E.—on Frisco R.R.—160 acres—2 hangars.
Tulsa	Broakins field—4 mi. E. and 1 mi. S—small lake—1300×2500 ft.—hangars—supplies by Curtiss Southwest Airplane Co.
Vinita	Fair grounds—emergency field.
Watonga	Bohr pasture field—N.E. corner of town—2500×1500 ft.—ideal—Old Mill to S. and R.R. to E.—good wet—Army used—alt. 1326 ft.—pop. 2500.
Waurika	Kelly pasture field—S.E. of town—good field—½ mi. E. of R.R. and N.E. of round house—good wet—alt. 1000 ft.—pop. 3000.
Woodward	Municipal (Gerlock) field—¾ mi. S.W.—½×⅜ mi.—1 mi. S. of Canadian river—hangar—good wet—alt. 1900 ft.

OREGON

CITIES	
Albany	Municipal field—1 mi. S. on W. of Pac. R.R.—1400 ft. square—ideal—along Power line—"T" mark—good wet—alt. 212 ft.—pop. 7500.
Ashland	Comm. club (Waite Tract) field—1 mi. N.—1200×1600 ft.—good—but soft if wet—"T" mark—alt. 1800 ft.
Baker	Fair grounds—½ mi. track—1½ mi. N.W.—alt. 3400 ft.
Columbia River	U. S. Naval Air Station—seaplanes.
Corvallis	Taylor's pasture field—¾ mi. N. of College—3000×1500 ft.—ideal unless very wet—wires on S. and E.—alt. 250 ft.—pop. 6000.
Cottage Grove	Emergency field—1 mi. S.—900×600 ft. R.R. on W. end.
Dallas	Municipal (La Creole) field S. of river—next to fair grounds—450×900 ft. arrow in center—fair wet—alt. 300 ft.—pop. 3000.
Eugene	Municipal (Holders) field—1½ mi. S. of R.R. "V"—1290×2625 ft.—ideal—½ mi. S.W. race track—2 mi. S.W. Willamette river—"T" mark—service by Eugene Aero Co.—alt. 420 ft.—pop. 15,000.
Eugene	Forest fire patrol station.
Grants Pass	Dr. Loughridge field—1 mi. N.—near Pac. R.R.—666×2400 ft.—ideal—good wet—"T" mark—alt. 956 ft.—pop. 4,500.
Grenda	Emergency field—S. of town—800×2000 ft.—W. of S. P. R.R.
Imbler	Emergency field—around in open farm country.
Lebanon	Emergency field—W. of Academy—near R.R.—2000 ft.
La Grande	Municipal (Kennon) field—3½ mi. E.—near race track 320 acres—ideal—good wet—alt. 2270 ft.—pop. 7000.
Marshfield	Municipal (Wasburg Co.) field—½ mi. out along Coos Bay and S.P.R.R.—1000×500 ft.—good wet—oil tanks at N. and S. ends.
Medford	Emergency field—along S.P.R.R. —between orchard and houses—650×1000 ft. rough—in S. city limits—power wires.
Medford	Medford field for Forest fire patrol—hangars and wireless sta. at fair grounds field.
Pendleton	Jones farm field—½ mi. out on hill—600×2000 ft.—rough and hilly—otherwise good—open hilly country around.
Portland	Municipal field—S.W. part on R.R. to canal—2200×600 ft.—ideal—near golf c. and Reed college—bridge N.—alt. 32 ft.—pop. 325,000.
Portland	Oregon, Wash. and Idaho Airplane Co.—Curtiss dist. with ideal field—2 mi. S.W.—800×1400 ft.—lake to N.E. and W. sides—4 hangars, circle and gas sta.—service and supplies.
Portland	Aero Club of Oregon.

Roseburg	Municipal (Hannan) field—1½ mi. S.—800×3000 ft.—along river—between rd. and R.R.—ideal wet—alt. 450 ft.—pop. 7000.
Salem	Webfoot Aviation field—300 yds. N.E. of fair grounds track—53 acres square—ideal unless very wet—marked.

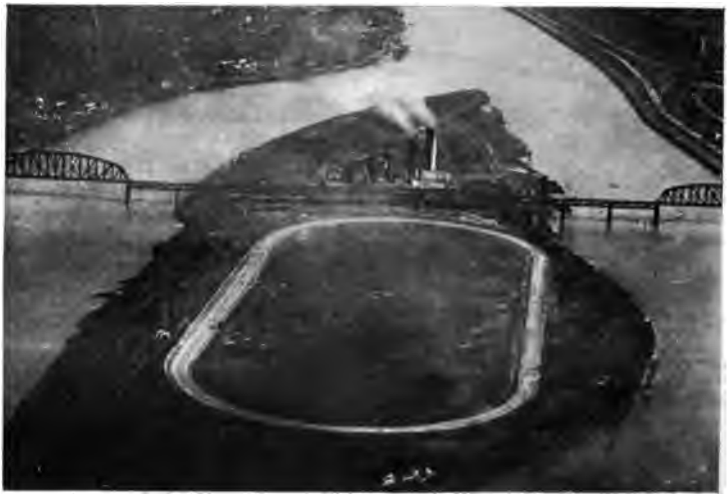
(*U. S. Air Service Photo.*)

A Good Field Near Everett, Pa.

PENNSYLVANIA

CITIES	
Altoona	Municipal (Driving Park) field—1 mi. S.E.—900×1200 ft.—wires on end—good wet—alt. 1100 ft.—pop. 61,000.
Bellefonte	Aerial Mail field—1½ mi. N.E.—along rd.—40 acres—900 ×3600 ft.—ball park to W.—wires N. and S. sides—marked—hangar.
Bethlehem	Bethlehem Airplane Company.—Airplanes.
Bethlehem	Emergency field—4 mi. S. along stream—bldgs. and silo across road—1000×1500 ft.
Bustleton	Aerial Mail field—1 mi. out—45 acres—2 hangars—marked—14 mi. N.W. of Phila. out Broad st. blvd. to large circle then 3 mi. out on N. fork.
Carlisle	Emergency field on Government Hospital grounds.
Clarion	Shorty Craemer field—1 mi. E.—30 acres—hangar.
Clearfield	Emergency field—½ mi. race track.
Du Bois	Emergency field—Beavers meadow—450×1200 ft.
Dauphin	Emergency field—50 acres.
Everett	Emergency field—on farm as per photograph.
Erie	Emergency field—race track—4 mi. to East.
Essington	Essington Aviation School—water flying station.
Gettysburg	Emergency field—Gettysburg Battle field—Govn.
Harrisburg	Emergency field—old mile track along P. and R. R.R. between 13th and 16th streets—25 acres—grandstand and ball park.
Harrisburg	Middletown (Govn.) field—9 mi. S.E. on E. bank of Susq. river—circle mark and P-53—1600×1000 ft.
Hatboro	Commercial field—16 mi. N. along old York Road—gas and oil.
Huntington	Emergency field of Penn. Railroad Company.
Irwin	Irwin Aircraft Corp. field—1 mi. E. and 20 E. of Pittsburgh on Penn. R.R.—hangar and fuel.
Johnstown	Cambria Steel Co. field—3 mi. S.W.—500×1500 ft.—ideal—2 mi. W. of C. club—alt. 1775 ft.—pop. 80,000.
Lancaster	Aero Club of Lancaster and field.
Lancaster	Fair grounds track and C. club emergency fields.
Leetsdale	Pittsburgh Airport—see Pittsburgh.
Lehighton	Fair grounds—½ mi. track—good wet—alt. 580 ft.
Lewiston	Race-track—½ mi.—emergency.
Middletown	Aviation Supply Depot and field—½ mi. W. of race-track—along Susq. river—1600×1000 ft.—ideal—hangars—circle and P-53—mark—9 mi. S.E. of Harrisburg—7 mi. S. Penn R.R. to Wash., D. C., leaves Susq. river.
Mount Union	Municipal field—N. city limits—between R.R. and river—1000×3000 ft.—ideal—alt. 600 ft.—pop. 6000.
Mechanicsburg	Municipal field of 30 acres.
New Brighton	Emergency field—Beaver country club.
Penllyn	Emergency field—Polo grounds—300×1200 ft.
Philadelphia	Aero Club of Pennsylvania.
Philadelphia	Curtiss-Eastern Airplane Corporation—dist.
Philadelphia	Phila. Aero Service Corp.—field and school—6 mi. S.W. across river at junction of roads—hangar and service.

PHILADELPHIA	Pine Valley field—12 mi. S.E. of Camden, N. J.—4200×3800 ft.—ideal—hangars and mark—service and supplies by Curtiss Eastern Airplane Corp.—near small lake.
PITTSBURGH	Aero Club of Pittsburgh.
PITTSBURGH	Pittsburgh Airport—11 mi. N.W.—near Leetsdale and bridge over Ohio river—1600×2000 ft.—hangar and mark.
READING	County Poor Farm field—2 mi. S.W.—52 acres—ideal—between rd. and County bldgs.—wires on N.—alt. 250 ft.—pop. 115,000.
SCRANTON	Municipal field—7 mi. N.—along D.L. & W. R.R.—40 acres square—1800×2300 ft.—ideal—hangar and mark—alt. 1500 ft.—pop. 300,000.
UNIONTOWN	Speedway field—2 mi. out in mi. track—675×2274 ft. stream through center E. to W.—trees N.E. corner-land E. to W.
WASHINGTON	Wallace field—1½ mi. N.W.—near car barn—along R.R.—900×1500 ft.—C. club field and on hill in wet weather.
WILKES-BARRE	Suburban park—emergency field.
WILKES-BARRE	West Side Park across Susq. river from city.
WILKES-BARRE	Field Artillery park—Old West Pittston fair ground site
WILLIAMSPORT	McCormic, Motor Car Co. field—along Susq. river—100 acres—hangar and mark to be.



(U. S. Air Service Photo.)

Pittsburgh, Pa.

The Bridge, 150 ft. high, and High Tension Wires across this half-mile track make this field too dangerous; even for emergency landings.

RHODE ISLAND

CITIES	
Apponaug	Emergency field—W. of race track—3 mi. S. of Hills Grove.
Bradford	Emergency field—listed by U. S. Air Service.
Collingwood	Race track—Commercial field—by Allan Bourdon.
East Greenwich	Gallaudet Aircraft Corporation—aeroplanes.
Hills Grove	McGrath field—8 mi. from Providence and halfway to East Greenwich—2000×1200 ft.—good wet—on rd.—near N.Y.N.H. and H. RR.—2 mi. from chimney—marked Appanang—pop. 410.
Narragansett Bay	U. S. Naval Air station.
Newport	Emergency field—in Polo grounds.
Providence	Race-track field—1½ mi. S.W.—also Gaspee Point.
Quonsett Point	Emergency field—owned by State—on bay—8 mi. S. of East Greenwich—unlimited space.
Sandy Point	Emergency field—5 mi. E. of East Greenwich
Shannock	Emergency field—East of town.
Slocum	Emergency field—E. of R.R.
Weed River Junction	Emergency field—E. of town.
Woonsocket	Emergency field—½ mi.—oval—300×1200 ft.—wires and trees.

SOUTH CAROLINA

CITIES	
Aiken	Hitchcock field—1 mi. S.E.—150×1000 ft.—E. and W.—good wet—on N. side of race track.
Bomberg	Plenty of open fields for emergency landings.
Bennettsville	Emergency field—Bennettsville Flying field—1800×525 ft.
Camden	Pasture field—2½ mi. N.—600×3000 ft.—ideal—woods N.—bldgs. W. end.
Charleston	Pasture field—country club golf links—objection.
Charleston	Pasture field—in Hampton park—used by Victory Loan.
Chester	Emergency field.
Columbia	Emerson field—2 mi. S.E.—1000×2500 ft.—ideal—hangars and mark—supplies by Carolina Aircraft Corp.
Duewest	Government experimental station—for aerial mail service.
Greenville	Camp Servier field—4 mi. N.E.—test gas in city.
Latta	Emergency field—listed by U. S. Air Service.
Pinehurst	Emergency field.
Sumter	Emergency field—listed by U. S. Air Service.
Tillman	Emergency field—listed by U. S. Air Service.

SOUTH DAKOTA

CITIES	
Aberdeen	Emergency field—listed by U. S. Air Service.
Newell	Northwest Aircraft Corp.—Lincoln Standard planes and Hispano motors.
Redfield	Emergency field—listed by U. S. Air Service.
Mobridge	Mobridge Aero Club.
Sioux Falls	Sioux Falls Aircraft Engineering Co. field—1 mi. W.—400×800 ft.—across rd. from Dairy—river to E. and Greenhouse N.E.—smooth and good wet—alt. 1600 ft.—pop. 28,000.
Tyndall	Tyndall Aeroplane Co. field to N. and N.E. of water tank—1000×1200 ft.—hangar—circle on roof—good wet—alt. 1280 ft.—pop. 1500.

TENNESSEE

CITIES	
Albany	Emergency field—listed by U. S. Air Service.
Alexandria	Emergency field—listed by U. S. Air Service.
Chattanooga	Municipal (Marr) field—N.E. of city—2 mi. E. of river—along R.R.—2200×1000 ft.—ideal—circle mark—alt. 700 ft.—pop. 110,000.
Chattanooga	Chattanooga Auto and Plane Co.—Curtiss Aeroplane Dist. Hangars and Service.
Clarksdale	Memphis Aerial Co. field—near country club—hangars—
Cleveland	Johnston (Emmett) field—½ mi. S.W.—3000×2000 ft.—circle mark—ideal—alt. 810 ft.—pop. 8000.
Dyersburg	Emergency field—listed by U. S. Air Service.
Fayetteville	Smith pasture field—1½ mi. N.W.—2500×3500 ft.
Huntington	Emergency field—listed by U. S. Air Service.
Jackson	Mason pasture field—2½ mi. W.—2000×3000 ft.—ideal along R.R. and wires—wood around S.W. corner.
Jellico	Municipal (Jellico Aero Club) field—60 acres —ideal—hangars and gas.
Johnson City	Emergency field—listed by U. S. Air Service.
Knoxville	Cherokee c. club and ½ mi. race track—emergency.
Lexington	Emergency field—listed by U. S. Air Service.
Memphis	Municipal (North Memphis Driving Park)—1 mi. track—1 mi. from river—900×2000 ft.—ideal—hangar and gas sta. in field.
Memphis	Memphis Aerial Company—Curtiss Aeroplane distributor.
Morristown	Emergency field—listed by U. S. Air Service.
Willington	Park field—Government—listed by U. S. Air Service.
Nashville	Roody field—2½ mi. N.E.—along Cumberland river—1500×2300 ft.—bldgs. on E. and S.—ideal—poor wet.
Nashville	Hampton pasture field—4 mi. W.—3000×1800 ft.—rough, trees on E. side—land N. and S. only.
Somerville	Emergency field—listed by U. S. Air Service.
Sugar Tree	Emergency field—listed by U. S. Air Service.
Sweetwater	Emergency field—listed by U. S. Air Service.
Union City	Emergency field—listed by U. S. Air Service—race track.
Woodbury	Emergency field—listed by U. S. Air Service.

TEXAS

CITIES	
Abbott	Tinsley farm field—1¼ mi. S.—40 acres—triangular—ideal—between R.R. and trolley line—good wet.
Abilene	Abilene field—2 mi. E.—50 acres square—ideal—good wet—2 hangars on W. side—country around is good.
Alpine	R.R. Station field—built by Army Air Service for emergency landings—900 ft. long.
Altuda	R.R. Station field—built by Army Air Service—for emergency.
Amarillo	Panhandle Aero Centre.
Amarillo	Bivins (Municipal) field—to W.—near R.I. R.R.—½ mi. square—ideal wet—hangar—service by Panhandle Aerial Service Co.—alt. 3669 ft.—pop. 18,000.
Artesia	Emergency field—3 mi. S.—on W. side of R.R.—good.
Austin	Penn field—(Camp Mabry)—4 mi. N.W.—100 acres—1200×2500 ft.—between 7 bldgs. and R.R.—water tank S.W. corner—good wet—National Guard of Texas field—alt. 650 ft. —pop. 41,000.
Beaumont	Municipal field—1200×800 ft.—hangar no longer available.
Belcherville	Grenshaw pasture field—1¼ mi. N.—along rd.—600×700 ft.—ideal—good wet—good fields around.
Benbrook	Carruthers field—Army Air Service—edge of town.
Benchley	Emergency pasture field—½ mi. E.—30 acres—ideal except few trees—country around is wooded.
Big Spring	Municipal field—Cole and Strayhorn addition.
Blockner's Ranch	Near Rio Grande river—used by Border Patrol pilots.
Bonham	Steegars pasture field—2½ mi. N.W.—along T. and P. R.R.—150 acres.
Bonham	Smiths meadow—3 mi. E.—on rd.—½×¼ mi.—1 mi. N. of R.R. and 1½ mi. N.W. of stand pipe—soft wet—alt. 600 ft.—pop. 6000.
Bowie	Hutchinson Farm field—1¼ mi. N.—30 acres square—along rd.—ideal—good wet.
Bracketville	Fort Clark Drill grounds—½ mi. S.W.—4000 ft. square—rd. leads from Fort to field—ideal—good wet
Brenham	Stone meadow—1 mi. S.—near Sante Fe R.R.—40 acres—ideal—good wet—marker—40×60 ft.—hangar—alt. 300 ft.—pop. 5000.
Brownsville	Emergency field—listed by Army Air Service.
Bryan	Bryan field—2½ mi. S.—along rd. and trolley line—2000×3000 ft.—ideal—good wet—2 mi. from College station.
Cactus	Emergency field—¼ mi. N. of R.R. Station—good.
Cameron	Shillers pasture field—1½ mi. N.—between 2 small creeks—1500×2000 ft.—ideal—soft if wet—open fields around.
Corpus Christi	Fort Scully—Army post—Old Camp Scurry field to be built on or cultivated—plenty open fields.
Cotula	Emergency fields—1 and 2 mi. W.—good all year.
Crowell	Municipal (High School) field—¾ mi. N.W.—near 3 story white brick school—6000×3000 ft.—ideal—good wet—baseball diamond on field—alt. 1300 ft.

Dallas	Love field—Army Air Service.
Dallas	Aeroplane and Mechanical Trade Inst.—Commercial.
Del Rio	Municipal field—160 acres—ideal—oil and gas—Govn. Post.
Denison	Municipal (Collins meadow) field—3 mi. N.—60 acres—ideal—along rd. and wires—good wet.
Desdemona	Jones Farm field—1 mi. N.W. on rd.—800×2000 ft.—good—¼ mi. S.W. of 3 tanks—trees around field—good wet—alt. 1600 ft.—pop. 12,500.
Dilly	Emergency fields—around and good.
Dryden	R.R. Station field—built by Army Air Service for emerg.
Eagle Lake	Griffin field—N.W. edge—1 mi. ×2000 ft.—ideal—good wet—Army "T" and white line mark—alt. 74 ft.—pop. 2200.
Eagle Pass	Municipal field—ideal—90th Aero Squadron—pop. 10,000.
El Paso	Fort Bliss, Army Post—Army Air Service—1st Surveillance Group.
Everman	Barron field—Government—edge of town.
Falfurias	Municipal field—promised—now emergency.
Farwell	Municipal field—Hamlin field.
Fort Clark	Parade grounds—Army Post.
Fort Hancock	Emergency field and very small.
Fort Stockton	Parade grounds—¾ mi. S.W.—160 acres—ideal—good wet—former Army Post—alt. 3050 ft.—pop. 1500.
Fort Worth	Taliferro field—Army Air Service—11 mi. N.—ideal.
Fort Worth	Barron field—Army Air Service—12 mi. S.—ideal.
Fort Worth	Fort Worth Transp. Co.—passenger carrying and photography.
Friona	Municipal field—Friona field.
Gainesville	Whaley and Janes pasture field—½ mi. S.—along rd. and wires—50 acres square—ideal—good wet—flag N. end—alt. 733 ft.—pop. 11,000.
Galveston	Fort Crockett—Govn. emergency field—to W.—1000×2500 ft. with R.R. track running through center E. to W.—alt. 17 ft.—pop. 50,000.
Galveston	East beach—1½ mi. outside Sea Wall on flat hard beach—10,800×600 to 2000 ft. wide—ideal—was used by Army pilots.
Galveston	U. S. Naval Air Station.
Hebronsville	Municipal field—promised—emergency now.
Henrietta	Worshams pasture field—¾ mi. E.—1200×2400 ft.—good wet—surface tank in center—2 ditches and few trees.
Herne	Elite pasture field—1¼ mi. S.E.—35 acres —triangular—ideal—R.R. and wires S.—rd. to W.—good wet—hilly country around.
Hester's Ranch	Emergency—good field about 1500 ft. square.
Hicks	Taliaferro field—Government—ideal.
Hondo	Emergency pasture fields for landings.
Houston	Aero Club of Texas.
Houston	S. E. J. Cox field—5 mi. S.—near Rice Institute—2500×3000 ft.—rd. and trolley line ½ mi. E.—ideal hangar—good wet—pop. 79,000.
Houston	Ellington field—government.

Jolly	Jenkins pasture field—¼ mi. E.—beyond R.R.—3000 ft. square—ideal—good wet—other good fields around.
Katy	Vogel prairie field—½ mi. N.—across rd. and E. of R.R. Station—Farm bldgs. near and shed in field—225 acres—ideal—good wet.
Kemah	Roberts field—1 mi. E. of Clear Creek on E. side of R.R.—1600×1800 ft.—ideal—good wet—alt. 22 ft.—pop. 75.
Kingsville	Municipal field—promised—now emergency.
Langtry	Built by Army Air Service for emergency landings.
Laredo	Fort McIntosh—Govn. Army Post—8th Aero Squadron.
League City	Dairy farm field—2 mi. N.W. of League City Interurban Car line station—1 mi. square—ideal—bldgs. in S.E. corner by rd.—2 Silos and flag pole in field—ideal fields around.
Liberty	Liberty field—emergency field.
Longfellow	R.R. station field—built by Army Air Service—for emergency landing.
Lubbock	Emergency race-track field.
McAllen	8th Aero Squadron U.S. Army Airdrome—Border Patrol—1 mi. S.E.—100 acres square—ideal—good wet—circle and "T."
McLean	Municipal McLean field.
Marathon	R.R. Station field—built by Army Air Service for emerg.
Marfa	Army Post Parade grounds—Army Airdrome—104th Aero Squadron.
Marlin	Wrenn field—1½ mi. N.E.—20 acres—fenced—wires N.—good wet—tower in center of field—also 1 mi. race track—alt. 520 ft.—pop. 8000.
Mineola	Pasture field—1 mi. S.W.—300×1000 ft.—ideal—good wet—surface tank in N.E. corner—alt. 400 ft.
Mount Pleasant	Mt. Pleasant Com. Aviation Co. field—1 mi. W. on rd.—near R.R.—1500×2000 ft.—ideal—good wet—hangar and "T"—alt. 426 ft.—pop. 5000.
New Boston	Hart meadow—1 mi. E.—along rd.—N. of T.P.R.R.—100 acres square—ideal—good wet—alt. 372 ft.—pop. 2000.
Nocona	Skeens pasture field—1 mi. N.—along rd. and wires—1500×1800 ft.—ideal—good wet—good fields around.
Palestino	Emergency field—1¼ mi. S. on rd.—40 acres square—ideal—good wet—trees, fence and bldgs. around—country hilly and woods.
Paris	Municipal field—1¼ mi. S.—near bldgs. and tel. wires—40 acres square—ideal—good wet—hangar to be—country hilly and woods.
Port Arthur	Navy Balloon school—Naval Air Station.
Presidio	Emergency field—ideal—was used by Army Air Service.
Pumpville	R.R. Station field—built by Army Air Service for emerg.
Ringgold	Emergency pasture field—¾ mi. W.—along R.I.R.R. and wires—600×1000 ft.—ideal—good wet—good fields around.
Sabinal	Emergency field—1¾ mi. E.—along R.R.—¾ mi. long—ideal.
Saint Joe	Johnson meadow—1¼ mi. N.—along rd. and wires—50 acres square—ideal—good wet—good fields around.

SAN ANGELO.....Williams Aero C. field—2 mi. S.W.—near cemetery—900×600 ft.—hangar—good wet—house S.E. corner—alt. 2000 ft.—pop. 14,000.

SAN ANTONIO....Aero Club of San Antonio.

SAN ANTONIO....Kelly field, No. 2—(Also Brooks field) Active Air Service field—15 mi. S.W.—hangars and marks—ideal—2×1.

SANDERSON......U. S. Airdrome—1 mi. N.W.—N. of R.R.—1500×3180 ft.—ideal—good wet—200 ft. hills around—hangars—alt. 3000 ft.—pop. 500.

SAN DIEGO......Municipal field—promised—now emergency.

SAN MARCUS....U. S. Army (Johnson) field—2 mi. out on R.R.—22 acres—oblong—soft wet—2 mi. from river—alt. 791 ft.—pop. 5000.

SAN YGNACIO....Emergency field—listed by Army Air Service.

SHERMAN........Auto and Tractor school field—1½ mi. N.E.—250×2500 ft.—ideal—good wet—N.E. of R.R. shops—alt. 720 ft.

SHUMLA.........R.R. Station field—built by Army Air Service for emerg landings.

SOUTH HOUSTON..Emergency field—3 mi. S.W.—near rd. and trolley line—6 mi. N.W. Ellington field—2×3 mi. long—was used as Night Bombing field—ideal.

SPOFFARD.......Emergency field—edge of town—along R.R.—1800×300 ft.—ideal—pop. 200.

SWEETWATER....Municipal field—1¼ mi. S.—320 acres—ideal—good wet—hangar and repair shed is contemplated.

TAYLOR.........Turner pasture field—¾ mi. N.W.—1600 ft. square—alt. 576 ft.—pop. 10,000.

TEMPLE.........Williams field—2 mi. N.—between rd. and R.R.—1500×3000 ft.—ideal—good wet—hangar and service—good fields near.

TESNUS.........R.R. Station field—built by Army Air Service for emerg.

TEXARKANA.....Emergency field—country club golf course.

TYLER..........Armstrong meadow—1¼ mi. N.E.—900×900 ft.—good wet—10 in. ditch runs E. and W.—land E. and W.—fields are few.

UVALDE.........Emergency fields—around—old field in oats.

VICTORIA........Welder field—was used by Army—1300×1700 ft.—ideal—High school at end—windmill other end in corner—soft wet—2 mi. E. of river—alt. 90 ft.—pop. 7000.

WACO...........Rich field—Army Air Service to abandon—3 mi. out.—600 acres—ideal—good wet—hangars—tower and tank markers—will be used commercially—alt. 500 ft.—pop. 60,000.

WAXAHACHIE....Coleman pasture field—3½ mi. W.—35 acres square—ideal—good wet—Farm bldgs. to S.

WEBB...........Hill field—¼ mi. N.E. of R.R.—good emergency.

WHITESBORO.....Rollins pasture field—½ mi. N.—900×1500 ft.—"V" shape—good wet—land E. and W.—woods N.—wires and bldgs. S.

WICHITA FALLS..Call field—government field.

YOAKUM........Emergency pasture field—on edge of town—600×1500 ft.—ideal—along road and street—was used by Army pilots.

UTAH

CITIES	
OGDEN	Municipal field—6 mi. N.—3000 ft. square—ideal—mts. 3 mi. E.—Sanitorium and depot—¼ mi. E.—circle with Ogden in center—good wet—wires in S.E. corner—gas and oil on field—alt. 4300 ft.—pop. 33,000.
MILFORD	Municipal field—2 mi. W.—40 acres—marker.
HENEFER	Which is N.W. of Coalville has emergency fields to its N.W.
SHAFTER	Plane can land most anywhere in broad valley.
SALT LAKE CITY	Aero Club of Utah.
SALT LAKE CITY	Municipal (Buena Vista) field—3 mi. S.W.—2000 ft. square—90 acres—good—between power wires and R. R.—Irrigation Canal on W. side—"T" for wind direction—alt. 4200 ft.—pop. 150,000.
SALT LAKE CITY	American Aeroplane Company.
SALT LAKE CITY	Utah Aeroplane Company—passenger carrying.
SOLDURO	Emergency field—Trans-Cont. race stop.

VERMONT

CITIES	
BELLOWS FALLS	Osgood and Stickney—Curtiss Aeroplane dealers.
BENNINGTON	Emergency field—listed by U. S. Air Service.
BRATTLEBORO	Emergency field—good—marked 100 ft. circle.
BURLINGTON	Emergency field—good at Fort Ethan Allen.
MONTPELIER	Emergency field—race track.
RUTLAND	Aero Club of Vermont.
SAINT JOHNSBURY	Emergency field—along the river.
SPRINGFIELD	Hartness field—3½ mi. N.W.—1400×1400 ft.—"L" shape—along rd. near small woods—good wet—used by Osgood and Stickney—alt. 900 ft.—pop. 7000.
WHITE RIVER JUNCTION	Municipal field—½ mi. from R.R. Station—30 acres—marked.
WINDSOR	Emergency field—(1800×400 ft.—(marked "T")?

Old Race Track Field, Salt Lake City, Utah.

VIRGINIA

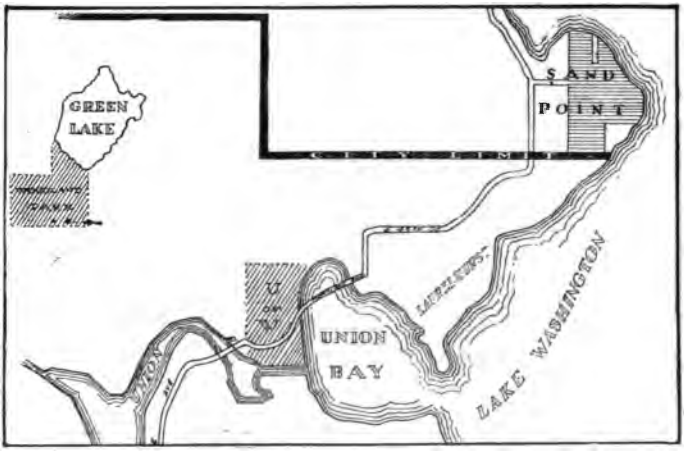
CITIES	
Blacksburg	Emergency field—only on Athletic field of Va. Poly. Institute—1200×600 to 300 ft.—Gym. and grandstand in field—trees all around—has been used for emergency only.
Franklin	Emergency field—near town and 900 ft. from Seaboard Air Line R.R. and 1 mi. from So. R.R.—1000 ft. square—ideal—level pasture—good wet—trees N.E.—wires and house S. and ditch W. end—alt. 500 ft.—pop. 5000.
Fredericksburg	Municipal field—fair grounds race track and large clover field just across bridge from town.
Hampton	Langley field—oval shape—900×2000 ft.—ideal—hangars and wind indicators—Active Air Service field.
Hampton	U. S. Naval Air Station for seaplanes and flying boats.
Lee Hall	U. S. Army Balloon school—26th and 30th companies.
Lyells	Ward's (Bladensfield farm) field 1¼ mi. S.E.—50 acres—ideal—300 yds. N. of gray roofed house.
Lynchburg	Y.M.C.A. Island field—1400×250 ft.—Club house, boat house and ball field—elevated R.R. each end of Island.
Lynchburg	Lynchburg Air Service Corp. field—3½ mi. S.W.—2000 ×1200 ft.—1 mi. W. of fair grounds—hangar, wind cane and circle—good wet—Curtiss Aeroplane distributor—alt. 700 ft.—pop. 36,000.
Newport News	Newport News Aero Club.
Newport News	Curtiss Aeroplane and Motor Corp. Training school field—2 mi. out on car line—oblong field—good wet—large hangar; also flying boat station—pop. 35,000.
Norfolk	Norfolk Airport—4 mi. out and halfway to Ocean View—800×1800 ft.—good wet—marker and sign on hangar roof—supplies by A.E.F. Flying Corp.—pop. 67,500.
Norfolk	Naval Base—parade grounds.
Petersburg	Cook field N. section of town—700×2500 ft.—along car line to Richmond—house and quarry N.W.—rd. and trees S.—laid out in building lots and was used to carry passengers.
Petersburg	Camp Gill—Army post.
Quantico	Marine field for emergency landing.
Richmond	American Flying Club of Virginia.
Richmond	Aviation General Supply depot.
Richmond	Fair grounds—mile race-track field—good wet.
Richmond	Shepherd field—2 mi. W. of City Hall—¼ mi. S. of fair grounds—695×2000 ft.—rough—circle around tree in center of field—alt. 200 ft.—pop. 170,000.
Suffolk	Withers farm field—2 mi. N.—along rd.—800×1200 ft.—good—R.R. and church E.—farm bldgs. and garden W.—trees N.
Yorktown	Naval Air Station—Navy balloon field.

WASHINGTON

CITIES	
Auburn	Emergency field—many—good emergency fields.
Bellingham	Emergency field golf course—1½ mi. N.—1500 ft. straightaway Club House on field—trees and ditches—soft wet—coal mine—bunkers and stacks—1¼ mi. to S.—alt. 30 ft.—pop. 32,000.
Camp Lewis	Government camp—good field on parade grounds.
Chehalis	Municipal fair grounds—half way to Centralia—2 mi. N. —350×1000 ft. in race track—soft wet—open fields at both ends —outside of fair grounds—to be enlarged.
Colville	Municipal (Athletic Park) field—2 blocks W. of main st.—R.R. to W.—river bed S.—1300×500 ft.—good wet—alt. 1635—pop. 2000.
Davenport	Emergency field—South of town good.
Ellensburg	Emergency fields around—Municipal field—promised.
Everett	Emergency field—Municipal field promised.
Greenacres	Emergency fields—green acres is 14 mi. E. of Spokane.
Irvin	Russell field—160 acres—ideal—good wet—W. of Spokane R.—near Spokane —along N.P. R.R.—hangar and mark to be.
Kent	Aerial Tours Co. field—¼ mi. W. and 15 mi. S. of Seattle—along rd.—4 smoke stacks—¼ mi. E.—1600×500 ft.—ideal—good wet—hangar and circle—used by Boeing Airplane Co.—alt. 39 ft.—pop. 4000.
Kennewick	Municipal (Kelso) field—on S. edge—160 acres—ideal—hangar, circle and "T" mark—open fields around.
Millwood	Emergency field—listed by U. S. Air Service.
Opportunity	Russell field—4 mi. E. of Spokane—1000×2500 ft.—ideal —good wet—lumber yard N.—R.R. and rd. to S.—hangar, circle and "T."
Pasco	Emergency field—good—Municipal field—promised.
Port Angeles	U. S. Naval Air Station—seaplanes only.
Puyallup	Emergency field—listed by U. S. Air Service.
Renton	Emergency field—listed by U. S. Air Service.
Ritzville	Municipal field—½ mi. S.—along R.R. and wires—600×1600 ft.—ideal—good wet—hangar, circle and "T" to be built.
Seattle	Aero Club of Seattle.
Seattle	Boeing Airplane Company—aeroplanes and sea sleds.
Seattle	Municipal (Sand Point) field—7 mi. N.E.—on Lake Wash.—230 acres—ideal—also for seaplanes—water to N.E. and S. R.R. to W.
Seattle	Barnes Aerial Transportation Co.—seaplane service to Tacoma.
Spokane	Russell Aviation Co.—Curtiss Aeroplane dealers.
Spokane	Municipal (Parkwater) field—4 mi. E. between Spokane river and trolley line—3000×3000 ft.—ideal—good wet—E. of old golf club house—alt. 1900 ft.—pop. 150,000.
Tacoma	Tacoma Speedway—7 mi. S.—in 2 mi. auto track—140 acres—ideal—alt. 300 ft.—pop.100,000.
Talmadge	Emergency field—fairly good—½ mi. S. of R.R.

WALLA WALLA	Smith farm field—2 mi. N.E.—3000×4000 ft.—level stubble field of sand and clay loam—Municipal field promised.
WATERVILLE	Emergency field—good—1½ mi. N.W.
WENATCHIE	Wenatchie Aviation Co. field—2 mi. N.E.—near Columbia river—2000×1500 to 300 ft.—fenced—rolling in center—land on 1000-ft. runway in N.W. end—Municipal field promised.
WHITE BLUFFS	Yakima Aviation Co. field on Yakima to Spokane route.
YAKIMA	Yakima Aviation Co. field on S. edge of city—along rd.—300×1000 ft. on runways—hangar and mark—municipal to be.
YAKIMA	Goodman alfalfa field—1½ mi. S. of above field—80 acres—ideal—"T" mark after crop is removed.

(Please note new fields and mail to author.)



Sand Point, Municipal Airport of Seattle, Wash.

WEST VIRGINIA

CITIES	
Bluefield	Aero Club and field—Aerial taxi lines.
Charleston	Aerial League of Charleston.
Fairmont	The Southern Aeroplane Co.—commerial field.
Huntington	Huntington Aeronautic Company—commercial flying.
Inwood	Emergency field—listed by U. S. Air Service.
Lamberton	Emergency field.
Martinsburg	Van Metre Blue Grass field.
Moundsville	Emergency field—listed by U. S. Air Service.
Wheeling	West Virginia Aircraft Company—aeroplanes.
Wheeling	W. Vir. Aircraft Co. field and flying school.
Wilbur	Emergency field—listed by U. S. Air Service.

(U. S. Air Service Photo.)

A Good Field Near Eau Claire, Wis.

WISCONSIN

CITIES	
ALMA	Emergency field—good field on Minn. side of river.
BAY CITY	Emergency field—good cross country field, top of hills.
BUFFALO	Emergency field—good cross country field.
COCHRANE	Emergency field—on Minn. side of river, also on bluffs.
CROSS PLAINS	Emergency field—over the hills S. W. of town.
DE SOTO	Emergency fields—40 to 160 acres—1 mi. out over the hills.
DIAMOND BLUFF	Great stretch—5 mi. N.W. between river and bluff.
EAU CLAIRE	Eau Claire Aero Corp. field—1½ mi. along rd.—1320 ft. square—good wet—hangar and mark—alt. 900 ft.
FERRYVILLE	Emergency field—good air farm over the hills.
FOUNTAIN	Emergency field—good—3 mi. N. and E. of river.
GREEN BAY	Green Bay Aero Club field—1¼ mi. S.W.—along Fox river—750×2500 ft.—ideal—good wet—hangar and marker—alt. 641 ft.—pop. 40,000—seaplane use river ½ mi. away.
GOTHAM	Emergency field—good field to South.
HAGER CITY	Emergency cross country field —top of hills—good.
JOHNSON CREEK	Emergency field—good.
KENOSHA	Macwhite Company—wire rope and stream line wire.
LA CROSSE	Aero Club of La Crosse.
LA CROSSE	Municipal field—2 mi. S. and W. of Miss. River—2½ mi. 60 acres—ideal—"T" mark—good wet—to be U. S. Aerial Mail field with hangar and equipment—alt. 680 ft.—pop. 35,000.

(U. S. Air Service Photo)

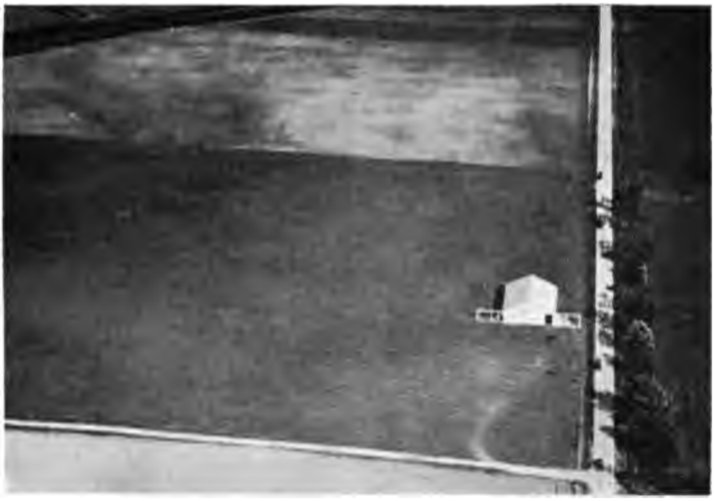
A Marked Field Near La Crosse, Wis.

LAKE MILLS	Emergency fields—40 to 160 acres of rolling farm land.
LONE ROCK	Fair grounds emergency—also fields of rolling farm land.
MADISON	Bryan farm field—160 acres—ideal—3½ mi. from farm bldgs. and green house which is 3½ mi. W. of Madison.
MAIDEN ROCK	Emergency good cross country field—top of hills.
MAZOMANIE	Emergency field—near town.
MILWAUKEE	Milwaukee Aero Club.
MILAWUKEE	Curtiss-Wisconsin Airplane Company—Curtiss distrib.
MILWAUKEE	Hamilton Aero Mfg. Co.—Hamilton propellers and Commercial field 4 mi. S. of Mil. Harbor and 2 mi. W. of Lake Mich.—On Layton Ave., near Howell Road—Service and Supplies.
MILWAUKEE	Lawson Air Line Transportation Company.
MILWAUKEE	Milwaukee County Airport field.
MINONG	Field marked with cross as per photograph.
NORTH CROSS	Emergency fields—good E. of river along valley.
OCONOMOWOC	Emergency field—good—2 mi. S.E.
PEKIN	Emergency field—good—to N.W. and E.
PHEASANT BRANCH	Emergency field—good—along R.R.
PURDY	Emergency field—good—between town and river.
QUINCY	Emergency field—good.
RHINELANDER	Municipal field at Oneida county fair grounds.
SPRING GREEN	Fair grounds field and others for emergency.
STEVENS POINT	Fair grounds—½ mi. track—alt. 1000 ft.—pop. 11,000.
STOCKHOLM	Emergency—good cross country field—top of hills.
SUPERIOR	Country club—emergency field.
WAUKESHA	Emergency fields—ideal—3 mi. N.E.—50 to 200 acres.

(*U. S. Air Service Photo.*)

Lawson Field at Milwaukee, Wisconsin.

(*U. S. Air Service Photo.*)
A Marked Field Near Minong, Wis.



(*U. S. Air Service Photo.*)
Fruit Field Near Milwaukee, Wis.

WYOMING

CITIES	
BUFFALO	Emergency field—listed by West. Aero. Corp. of Casper—pop. 2000.
BURNS	Emergency field—N. of town—race track to S.E. of town.
CASPER	Western Aeroplane and Motor Corp. Curtiss dealers—field—3 mi. E. between R.R. and river—½ mi. away—field is good wet—hangar and supplies—alt. 5400 ft.—pop. 7000.
CHEYENNE	Harry Hiles—Lincoln Standard planes and Hispano motors—distributor.
CHEYENNE	Fort Russell—Govn. Reservation—200 acres—ideal.
CHEYENEE	Municipal (Wales field)—between State Capitol, race track and Fort Russell—1800×3600 ft.—marked—good wet—gas and oil at Fort or garage—alt. 6000 ft.—pop. 18,000.
ELK MOUNTAINS	Emergency fields—10 mi. S. and broad planes to W. of Elk mts.
EVANSTON	Emergency field—listed by West. Aero. Corp. of Casper—pop. 3500.
GREEN RIVER	Municipal field—½ mi. S.W.—½ mi. S.W. of round house at W. end of Green River Bridge—600×1400 ft.—good wet—alt. 6100 ft.—pop. 2500.
GREYBULL	Emergency field—listed by West. Aero. Corp. of Casper.
LARAMIE	Emergency field—listed by West. Aero. Corp. of Casper.
LANDER	Emergency field—listed by West. Aero. Corp. of Casper—pop. 2500.
LUSK	Emergency field—listed by West. Aero. Corp. of Casper.
MONELL	Emergency field—to West of town.
RAWLINS	Municipal field—1 mi. E. in race track—about 40 acres—land from E. only—alt. 7000 ft.—pop. 5000.
RAWLINS	Emergency field N.E. of city and army field is S.E.
RIVERTON	Emergency field—listed by West. Aero. Corp. of Casper—pop. 1500.
ROCK SPRINGS	U. S. Aerial Mail field and Hangar. pop. 7000.
SHERIDAN	Municipal field—N. of creek—near race track—1800 ft. square—good wet—hangar and mark—alt. 4000 ft.—pop. 12,000.
SHOSHONI	Emergency field—listed by West. Aero. Corp. of Casper.
THERMOPOLIS	Emergency field—listed by West. Aero. Corp. of Casper—pop. 2000.
WHEATLAND	Emergency field—listed by West. Aero. Corp. of Casper.
WORLAND	Emergency field—listed by West. Aero. Corp. of Casper.

AIRWAYS THROUGH WYOMING

Cheyenne to Rawlins, country is very rough and a safe place to land would be hard to find. It would not be safe to leave the main line, U.P.R.R. as the mountains are very hazardous.

Rawlins to Denver, Colorado, flying over the mountains is very bad. The best way is to go to Cheyenne, Wyom., and follow the U.P.R.R. south with plenty of open fields for emergency landings.

Fort Russell Field at Cheyenne, Wyoming.

ALASKA

CITIES

Four DH-4B Liberty-motored aeroplanes landed at the following fields during their flight from New York to Nome, Alaska.

WRANGELL	Wrangell field—New York to Alaska Flight stop—Wrangell field to Hazelton, B.C. is 210 miles—Wrangell field to White Horse, Yukon is 300 mi.
WHITE HORSE	White Horse field is on a bluff—W. of town—1500×375 ft
WHITE HORSE	White Horse to Dawson, Yukon is 250 mi.
DAWSON	Dawson field is on W. side of the river—1080×555 ft.—Dawson to Fairbanks, Alaska is 275 mi.
FAIRBANKS	Fairbanks field to Ruby is 240 mi.
RUBY	Ruby field to Nome is 300 mi.
NOME	Nome field to Cape Prince of Wales is 100 mi. which is 50 mi. from the continent of Asia.

CUBA

CITIES	
HAVANA	Aero Club de Cuba.
HAVANA	Flying Boat Stations—routes to Florida.

HAWAIIAN ISLANDS

CITIES	
HONOLULU	Aero Club of Hawaii.
HONOLULU	Fort Schofield parade grounds—ideal field.
PEARL HARBOR	Luke field—4th and 6th Aero Squadron—coast defense.

PANAMA CANAL ZONE

CITIES	
ANTON	Anton field—ideal four way landing—good wet—pop. 1200.
AQUADULCE	Aquadulce field—for DH-4 aeroplanes—gas and oil.
BALBOA	Fort Amador—Army post.
BEJUCOM	Emergency fields—around in open country.
BOCAS DEL TORO	Emergency field—on Atlantic Coast—1500×300 ft.
COCOSOLA	Colon Harbor—Naval Air station.
CHORRERA	Emergency field—on high ground—1 mi. S.W.—good wet.
CRISTOBAL	France field—Active Army Air Service Coast Defense.
LAS TABLAS	Las Tablas field—which is rough.
OCU	Ideal field—2000 ft. square—good wet—approach any direction.
PENONOME	Municipal field.
SANTIAGO	Santiago field—which is very good.

PHILIPPINE

CITIES	
CAVITE	Army Aerial Coast Defence station.
CORANADO	Army Post.
FORT MILLS	Army Post.
MANILA	Aero Club of the Philippines.
MANILA	Major J.E. Stevenot—Curtiss Aeroplane Agent.

MEXICO

CITIES	
Mexico City	Valbuena Airdrome—Army.
Tampico	Emergency field to S. of city—2×8 mi.
Vera Cruz	Emergency field to S. of city—1¾ mi. square.

CANADA

ALBERTA

CITIES	
Banff	Banff field—commercial flying.
Calgary	Municipal Aerodrome—Downers Park field and fair grounds field—passenger carrying.
Edmonton	Edmonton field—New York to Alaska flight stop.
Edmonton	Edmonton to Jasper—200 mi.
Jasper	Jasper field—New York to Alaska flight field—8 mi. N.—along the Athabaska river—good—Jasper to Prince George, B.C., is 200 mi.

BRITISH COLUMBIA.

Prince George	Prince George field—New York to Alaska flight stop. Prince George to Hazelton, B.C. is 220 mi.
Hazelton	Hazelton field is a grassy slope—E. of town—on the hospital grounds—New York to Alaska stop—Hazelton to Wrangell, Alaska, is 210 mi.
Vancouver	Aero Club of British Columbia.
Vancouver	Aircraft Manufacturers Inc.—Boeing aeroplanes.
Vancouver	Commercial field and flying.
Victoria	Aero Club of Victoria.

MANITOBA

CITIES	
Brandon	Commercial field and flying.
Virden	Virden Aerodrome and commercial flying.
Winnipeg	Aero Club of Manitoba.
Winnipeg	Canadian Aircraft Company, Ltd.
Winnipeg	Western Canada Aircraft, Ltd.

ONTARIO

CITIES	
Cobourg	Emergency field.
Colborne	Emergency field.
Barrie	Camp Borden—formerly R.A.F.—now Can. Air Force.
Beamsville	Camp Beamsville—formerly R.A.F.
Belleville	Emergency field.
Brighton	Emergency field.
Deseronto	Rathburn field—formerly R.A.F.
Deseronto	Mohawk field—formerly R.A.F.
Kingston	Prison farm emergency field—formerly R.A.F.
Napanee	Emergency field.
Picton	Emergency field—fair grounds.
Toronto	Aero Club of Canada (Club rooms).
Toronto	Bishop-Barker Aeroplanes, Limited—Avro and Bristol Aeroplane.
Toronto	Erickson Aircraft, Limited—Leaside Aerodrome—hangars.
Toronto	Armour Heights Aerodrome.
Trenton	Emergency field.

SASKATCHEWAN

CITIES	
Moose Jaw	Commercial field and flying.
Regina	Commercial field and flying.
Regina	Air Service Association of Saskatchewan.
Saskatoon	Saskatoon field—New York to Alaska stop—Saskatoon to Edmonton, Alb., is 300 mi.—Saskatoon to Portal, N.D., U.S.A., is 280 mi.
Saskatoon	Commercial flying and passenger carrying.

TRANS-CONTINENTAL AERIAL MAIL ROUTE.

Field	Distance	Hangars
Hazelhurst, Long Island		3— 60×100
Bellefonte, Penn	230 Miles	1— 60×100
Clarion, Penn	100 Miles	1— 60× 60
Cleveland, Ohio	100 Miles	1—100×100
Bryan, Ohio	165 Miles	1— 80×100
Chicago, Ill	155 Miles	3— 90×100
Iowa City, Iowa	191 Miles	1— 60×100
Omaha, Neb	233 Miles	1—125×125
North Platte, Neb	248 Miles	1— 80× 90
Cheyenne, Wyo	205 Miles	1— 80× 90
Rock Springs, Wyo	237 Miles	1— 80× 90
Salt Lake, Utah	163 Miles	1— 80×100
Elko, Nevada	235 Miles	1— 60×100
Reno, Nevada	200 Miles	1— 80× 90
Sacramento, Cal	97 Miles	(Army Field)
San Francisco, Cal	92 Miles	1— 80× 90

AIR ROUTES

WASHINGTON, D.C. TO NEW YORK—235 MILES

Lt. Col. Hartz in a twin-motored machine "Round the Rim."

Leaving Bolling Field the first landing field available is that at the mail station, seven miles out of town. The field is about twenty rods east of the B. & O. Railroad. This field is well marked with two hangars and some other smaller buildings, a large white circle, and cinder runways out to the field proper. The field is in rather low ground, but has an excellent approach, and if one lands as near as possible to the end of the runways, the ground will be found hard enough.

Our course runs almost exactly midway between the Pennsylvania and the B. & O. from there to Camp Meade with no good fields.

Around Camp Meade, however, there are several possible fields. The country here is pretty badly chopped into small fields and the ground is for the most part clay which gives good fields in the dry weather and rather bad ones in the wet weather.

At Baltimore there are several fields that will do nicely. The Pimlico race track is rather rough but large enough, and has good hard ground. Clifton Park, a few rods west of a large oval reservoir is an excellent landing field if there are not too many baseball games going on on it. The golf course there is ample in size for any light ships. Six miles from the center of the city and just off the National High Way is a large field that is being prepared as the Municipal Landing Field.

From Baltimore to New York the fields are larger and a landing where the railroads cross the Susquehanna River. There are several hangars there and a well marked field. The best part of the field is right adjacent the hangars.

Good country prevails from thereon with the next gas station at Bustleton, which is northwest of the city of Philadelphia. From Philadelphia, follow the Broad Street Boulevard, a very distinct road with two sets of parking in it until reaching a large circle. Follow in a direct line the north fork of the road and Bustleton is just three miles from the circle. The two hangars are not well marked and the field is an easy one to miss. It is exactly half way in direct line towards the Philadelphia County Race Track. Good fields prevail from there to New York with the exception of the country right around Perth Amboy. On Long Island there are many fields the best of which are the Curtiss Airport, Roosevelt Field and Mitchell Field around Garden City.

NEW YORK TO AUGUSTA, ME.—384 MILES

Course leads out along a railroad along the northern shore of the Island. Good Landing fields all along the Island except the pilot must be careful to avoid low ground as it is swampy. Passed Montauk 9:10. Excellent wheat field for landing just North of railroad at this point. Altitude 2,000 feet.

Left Long Island 9:25 to Plum Island 9:27. Good landing field at fort with good approach. Headed for Fishers Island, Stormington, 9:40.

Pawcatuck, 9:42. Plenty of fields large enough but one would have to be very careful to avoid granite boulders which are there in large numbers and sizes.

Bradford, 9:46. A possible but not very good one way field here.
Wood River Junction, 9:47. Two fair fields just east of town.
Shannon, 9:51. Two good fields just east of town.
Slocum, 9:55. Two best fields since leaving Long Island just East of railroad.
East Greenwich, 10:02. Fields about here have many stones in them. Bad Landing.
Appanaugh, 10:05. Good landing field just west of Race Track. Perfect approach.
Providence, 10:10. Race Track 1½ mile southwest town, excellent field and approach.
East Junction, 10:20. Fields here are few and small.
Boston, Franklin Field. Good Field. Emergency only. Boston air port proposed.
Valiant, 10:50.
Salem, 10:55.
Beverly, 10:57.
Danver, 10:59.
Hamilton, 11:05. First Good Landing field in half an hour. 3 miles west from town.
Essex. Race Track.
Newburyport, 11:10. Several good fields just south of town.
Portsmouth, 11:23. Good field just southwest of town. 2 miles.
Portland. Landing Field northwest of town.
Lewiston. Several good fields along river. Almost all one way fields, quite a lot of pasture land, cattle must be avoided but make excellent fields.
Augusta, 1:04. Field rough for heavily loaded big ships but good for small ones. Field is half mile southwest of town and cannot be missed.

Country from Boston north is not very good for flying large ships though a landing could be made anywhere along the beach. It would be perfectly safe to send planes of the Curtiss type anywhere along there. Seaplanes could fly in perfect safety all over this section of the country as it abounds in large lakes that are almost contiguous.

AUGUSTA, ME., TO JAY, NEW YORK—352 MILES.

11:15—Left Augusta, Me., with strong head wind. Headed for Montpelier one hundred and thirty miles away. For twenty miles from Augusta landing fields were plentiful, until we came to a small town called Paris. From then on there were no fields that could be used for anything but a possible place to land in with least crack up. Passed over first mountain range at 12:15. There are no fields of any kind, no sign of railroad, houses, roads, fields, or anything but lakes, timber, and rock. Absolute wilderness.

11:25—Still flying compass course. Have not seen landmark, house, field, town or sign of human life for one hour and ten minutes until just now. Field here could be landed in after a fashion, but it is doubtful if one could ever get out of them. According to maps should be near Woodsville.

Montepelier, 1:45. Landing field marked with "T" in center race track. Cross Lake Champlain at Essex at 2:02. Along Lake Shore, landing fields plentiful in immediate vicinity.
2:12—Another range of mountains ahead. Country impossible again.
4:05—Found field. Fairly good field in Valley near Jay, N.Y.

JAY, N. Y., TO PLATTSBURG, N.Y.—35 MILES

Flying down valley of Au Sable River. Perfect landing two way field in Plattsburg Barracks.

PLATTSBURG TO BUFFALO, N.Y.—326 MILES

Left Plattsburg, 12:00.
Keesville, 12:12. Landing fields plentiful.
Au Sable Forks, 12:18. A few possible fields.
Lake Placid, 12:32. Excellent landing field two miles southwest of town commercially used.
Saranac Lake, 12:35. One medium one-mile field east of town.
Piercefield, 12:52. Lots of wood and lakes and very few small pastures.
Cranberry Lake, 1:18. Small pastures.
Benson Mines. No field.
Lowville, 1:50. First landing field possible since Cranberry Lake.
No houses, roads, or sight of civilization since 1:50 all woods and lakes.
Altitude, 4,500 feet, until in vicinity of Pulaski.
Pulaski, 2:18. Land anywhere in vicinity. Ground is very level and flat. Are nearing Lake Ontario. Landing can be made anywhere but one must be sure to land parallel with the water drains or dead furrow which are about twenty-four feet apart and eight inches deep. Soil is black loam.
Mexico, 2:28. Just passed Carthage.
Oswego, 2:40. Good fields.
Rochester, 3:30. Good fields, and between.
Lockport, 4:36. Good fields abundant. Could land anywhere but must be careful to land parallel to dead furrows. Landed Curtiss plant, four miles north of Buffalo and one and one-half miles east of river. Must land on runway as field is low and very rough off runway. Field has two large hangars (marked with circles) and small office building at east end of field. A large T marks best part of runway, which is very long, and lined by red flags on borders of runway. Flags about 3 feet high so pilots should be careful to keep to middle of runway.

BUFFALO TO NIAGARA FALLS, N.Y. AND RETURN—44 MILES

Left Buffalo 3:00 P.M. Flew to Niagara Falls. Good landing fields everywhere.
3:30—Returned to Curtiss plant. Left Curtiss plant for Cleveland. 5:07.

BUFFALO, N. Y., TO CLEVELAND, OHIO—188 MILES

From Buffalo south along the shores of the lake there are excellent fields everywhere, except that pilots must be careful to land with the water drains, and not across them.
Birdsall, 5:20. Good fields in every direction. ⅛ mile northwest of town there is a field approximately 300×1,200 ft., with grass covering.
Orchard, 5:30 P.M. 2 miles north of town there is a large hay field, approximately ½ mile by 500 ft.
Deroy, 5:34 P.M. There are fairly good fields covering this section.
Silver Creek, 5:38. Here there are small strips of forest, but very good fields between.

Dunkirk, 5:47. A landing can be made anywhere in this section. Good fields predominate.

Westfield, 6:01. The same is true here. There are excellent fields everywhere.

The Cleveland Aero Club have a large field in view, 10 miles southeast of the city, where both land and seaplanes can be handled. This is an excellent field, and if their present plans are carried out, is one of the best prospects I have yet encountered. At present the only available field which is at all satisfactory is that at the Martin plant.

CLEVELAND, OHIO, TO DETROIT, MICH.—143 MILES.

Flew over lake shore and found landing fields all the way with but one exception mentioned later.

Sandusky, 2:05. Good field.

Cedar Point, 2:25. Good field.

Maumee Bay and Toledo at 2:27. Country around here very swampy for ten miles each side of Toledo near lake shore. Inland there is good country. Reached Detroit 2:55. Landed Morrow Field at 3:05 P.M. Twelve hangars and excellent field.

DETROIT TO CAMP CUSTER, MICH.—134 MILES.

9:13 A.M. Landing fields everywhere, but rolling. Following Michigan Central double track railway.

Dearborne, 9:18. Fairly good emergency fields.

Wayne, 9:25. Fairly good emergency fields.

Ann Arbor, 9:40. Good fields but country is getting more rolling.

Delhi Mills, 9:45. Fairly good emergency fields.

Dexter, 9:50. Fairly good emergency fields.

Chelsea, 9:53. There are innumerable fields here that at a casual glance appear to be excellent but a very close scrutiny reveals contours in almost all of them. The country is almost all what was once covered by the lake and the soil is sand on the knolls and black loam in bottom lands. There is no place, however, that from three thousand feet a good field could not be located.

Landed Camp Custer, 10:31. Good field with excellent approach which will be well marked in future as in accordance with specifications as commanding officer ordered.

CAMP CUSTER, MICH., TO CHICAGO, ILL.—143 MILES.

Left Camp Custer, 1:26. 20 mile head wind.

Lawton, 2:02. Few emergency fields.

Decatur, 2:08. Few emergency fields.

Glenwood, 2:15. Few emergency fields.

Landing fields always available though most fields show contours.

Dowagiac, 2:20. Country very flat with plenty of fields.

Milea, 2:26. Country very flat with plenty of fields.

Buchanan, 2:28. Country very flat with plenty of fields.

Michigan City and Gary, 2:40. Only very few fields as country is well built up from here to Chicago.

Landed Washington Park. Large Park with a great many baseball diamonds. Field eleven hundred yards long. Perfect. Police object to landing here, as field is usually crowded. Jackson Park one mile south is not so crowded and is big enough.

The Chicago Aero Club field about 1½ miles southwest of city, has one large hundred foot wide hangar, several small hangars, and a field one mile square. Best place to land is directly in front of hangars where a place 1,000 ft. square has been carefully rolled.

I took up the question thoroughly with the Chicago Aviation Club with the idea of improving the entire mile square field. This they intend to do at once, putting in the markings as prescribed by the Air Service.

CHICAGO TO MILWAUKEE, WIS.—85 MILES

Left Chicago Aero Club field 12:15. Flew over city taking pictures.

Left from over Grant Park 12:30.

Arrived Camp Sheridan, 12:52. Never being out of gliding distance of excellent fields. At Waukegan, 12:58.

Excellent field one mile due south of town.

Arrived Milwaukee 1:08.

Landed Milwaukee Country Aero Club grounds at 1:15.

Landing field is one mile north of city limits, and four and one-half mile west of lake. Has several very long runways in the shape of the letter M with a line drawn through it as shown. Field is well drained and high. Adequate provision for staking planes down provided by iron rings set in cement on grounds.

MILWAUKEE TO LA CROSSE, WIS.—176 MILES.

Left Milwaukee 9:22.

Waukesha, 9:34. Country rolling but many emergency fields. One large field just east of city. One large "L" shaped field one mile west (excellent).

Delafield, 9:31. No field.

Oconomowoc, 9:45. Good field two miles southeast of town. First decent field since Waukesha.

Farmington, 9:48. No field.

Johnson Creek, 9:52. Good field one-half mile east of town.

Lake Mills, 9:58. Good field on east shore of Lake.

Dearfield, 10:05. No field.

Madison, 10:20. Several fair fields southeast. Nothing exceptional.

Pheasant Branch, 11:15. Good fields along railroad.

Black Earth, 11:30. Rough country, no satisfactory fields.

Mazomanie, 11:33. Fairly good fields.

Arena, 11:37. No fields.

Spring Green, 11:42. Excellent fields all through Wisconsin River Valley. Landings can be made any place.

Lone Rock 11:47. Good field on south side.

Gotham 12:00. Good fields south.

Burds Creek 12:10. Hills everywhere, no timber, possible landings.

Barnum 12:20. Hills everywhere, no timber, possible landings.

Ferrysville 12:25. Hills everywhere, no timber, possible landings.

De Soto 12:40. Hills everywhere, no timber, possible landings.

La Crosse 12:50. Excellent field under preparation by city.

LA CROSSE TO ST. PAUL, MINN.—132 MILES.

Left La Crosse 12:15 P.M. Good field for any class ship two miles north of city and east of river. Large valley ten miles north of La Crosse, east of Mississippi. Many large fields.

North Crosse, Wis., 12:25. Large valley east of river contains many good fields.

Quincy 12:29. Good fields around town.

Dresbach, Minn., 12:30. Country rough, contains many small fields.

Pine Creek 12:31. Good, small fields.

Dakota, Minn., 12:37. Good fields east side of town.

Winona, Minn., 12:36. Apparently two good fields south of city and adjoining town, near river. 1 good field 1½ miles west of Mississippi and ¼ mile south of city. No good fields east of river at this point.

Minnesota City, Minn., 12:40. Fairly good fields.

Fountain City, Wis., 12:46. Large cultivated areas, on surrounding hills—terrain rolling. Good fields three miles north and east of river.

Minneiska, Minn., 12:56. No fields.

This entire section very hilly and, along river bottom lands, marshy. Soil sandy but of fine quality that allows only slight inset to wheels.

Wabasha, Minn., 1:07. Good fields south of city close to highway.

Lake City, Minn., 1:15. Fairly good fields.

Hastings, 1:40. Fairly good fields.

Purdy, Wis., 12:48. Fairly good fields surrounding city, landings should be made between town and river. Valley leading east by north has apparently good fields.

Landings can be made anywhere in this section of Minnesota and Wisconsin, but with care as fields are on the tops of hills and are rolling.

Cochrane, Wis., 12:52. Good field on Minnesota side of river, also fairly good fields on bluffs on east side above the town.

Buffalo, Wis. Same country prevails.

Alma, Wis. Same country prevails.

Pepsin. Excellent fields to north, south and east.

Stockholm. Good cross country fields, top of hills.

Maiden Rock. Good cross country fields, top of hills.

Bay City. Good cross country fields, top of hills.

Hager City. Good cross country fields; top of hills.

Red Wing, Minn., 1:16. Good fields surround town.

Cannon Junction, Minn., 1:10. Good fields surround town.

Diamond Bluff, Wis., 1:16. No field near town but great stretch of fields five miles N. W. between bluff and river.

From the St. Croix River the fields are about perfect, being large, continuous with no fencing. The soil a rich loam and generally put to wheat.

This continues to within five miles of St. Paul. Here the fields become small and rough.

ST. PAUL, MINN., TO MONTEVIDEO.—132 MILES.

Left St. Paul 11:22.

Country west of Minneapolis broken by small woods and lakes.

Unsatisfactory, though possible, cross country landings.

Golden, Minn. Few small rough fields.

Valley, Minn. Few small rough fields.

Parker, Minn. Few small rough fields.

Wayzata. Fields fairly large and smooth.

Lazy Lake. A few fairly good fields.

Delano. No fields.

MILES CITY, MONTANA, TO BILLINGS, MONTANA

Left Miles City, 11:00.

Very good field, can be made excellent on reservation at Fort Keogh, Montana.

The fields on the table lands to the south of the Yellowstone continue good and in most cases are excellent. There are also a few good fields on the north bank.

BILLINGS, MONTANA, TO HELENA, MONTANA—220 MILES.

There are two fairly good fields about four miles west of town in bottom lands, these however would be bad in wet weather.

One excellent field approximately 640 acres on top of Table Rock just north of city. This is being prepared by city as municipal field.

Laurel, 12:14. Good two way field southwest of town.

Park City, 12:18. Good field one mile west of town along railroad.

Good fields half way between Park City and Columbus.

Columbus, 12:34. Two fairly good fields, one north and one just west.

Good four way field eight miles west of Columbus near railroad, and south of river.

Reid Point, 12:45. Good two way field just south of town.

Bridger Creek, 12:50. Good fields on both sides of creek.

Big Timber, 1:02. Good fields surround town and as a rule are as perfect as regular flying fields.

Mission, 1:20. Excellent fields abound.

Livingston, 1:30. Good fields east of city.

There are no fields available while passing over the mountains toward Bozeman.

Bozeman, 1:42. Fairly good fields surround town, the best lie east.

Manhattan, 2:00. Good fields on north side of town. Good field near railroad seven miles northwest of Manhattan.

Nothing for nearly thirty miles.

Townsend, 2:22. Good field northeast of town.

Winston, 2:30. Good field northwest of town.

Helena, 2:40. No fields.

Fort Harrison, 2:45. Fairly good field on reservation.

HELENA, MONT., TO MISSOULA, MONT.—90 MILES

Ellison, 10:04. Landing possible along railroad west of town.

Garrison, 10:22. Landing possible south side of creek.

Drummond, 10:37. Landing possible north side of creek and railroad.

No other fields were observed where landings could be made.

There is a stretch of about thirty-five miles where it would be impossible to land.

Missoula, 12:24. Landings could be made in many places in this valley. Excellent 2,000 ft. square field east of fair grounds and adjoining them. Excellent large field in reservation at Fort Missoula, if dragged.

MISSOULA, MONT., TO SPOKANE, WASH.—220 MILES

Left Missoula, 3:15.
Arbee, 3:30. Two good fields southeast of town along railroad.
Dixon, 3:38. Good fields about six miles north of city on Bison range. None near city.
Perma, 3:47. Possible landing south of city.
Paradise, 3:55. Possible field southeast.
Plains, 3:58. Good field northwest of town.
Thompson Falls, 4:15. Fairly good fields east of town. Watch out for stumps.
Heron, 4:45. Good field west of town.
Hope, Idaho, 4:58. No field.
Field between Hope and Sandpoint north of Lake.
Sandpoint, 5:05. No field.
Westmond. No fields.
Cocolalla. No fields.
Careywood. No fields.
Granite. No field.
Athol, 5:20. Good fields east and west of town.
Belmont. Good fields east and west of town.
Corbin. Good fields east and west of town.
Twin Lakes. Good fields east and west of town.
Garwood. Good fields east and west of town.
Rathdrum, 5:30. Good fields east and west of town.
Hauser. Good fields east and west of town.
Coeur d'Alene. A 160-acre field being prepared by city as permanent.
Greenacres. Good fields.
Opportunity. Good fields.
Irvin. Good fields.
Millwood. Good fields.
Parkwater. Good fields.

SPOKANE, WASHINGTON, TO TACOMA, WASHINGTON

The flying field at Spokane at the time of our visit though large enough was very poor owing to the fact of its having but one runway, grounds to the sides, rocky. On one side of the field there is a sheer drop into the river of 15 or 20 feet. On the other a wide road sufficiently ditched to upset a plane. There is, however, a large section of land adjoining this to the south which would make an excellent field.

SPOKANE, WASH. TO WATERVILLE, WASH.

There are a few scattered fields where emergency landings could be made with comparative safety.
Waterville. Field sufficiently large and smooth to handle Curtiss ship. One-eighth mile east of town. There is a large wide field 1½ miles northwest of Waterville, excellent field.
Avenport. A fairly good field south of town.
Wenatchee. Fruit country with few meadows sufficiently large for emergency landings.

WENATCHEE TO CLE ELUM.

A few narrow valleys through the Cascades where emergency landings might be made.
Talmadge. Half miles south of the railroad. A fairly good field.
Auburn. Many good fields.
Puyallup. Many good fields.
Kent. Many good fields.
Renton. Many good fields.
Seattle. No landing fields except for seaplanes.
Tacoma. Fairly good field in race track, also one southeast of town.
Camp Lewis. Excellent field on parade ground.

CAMP LEWIS, WASH., TO PORTLAND, ORE.—154 MILES

Yakima. Report adequate field. Dimensions unknown.
Chehalis. Fairly good field west of town. The country south is fairly good for emergency landings.
Kelso. A good field half miles northwest of town.
Portland. Excellent field one and a half mi. south of city, east of the river and opposite the two islands (care should be taken here, however, to avoid power wires).

PORTLAND, ORE., TO MEDFORD, ORE.—300 MILES.

Grenada. South and adjoining town, west of the Southern Pacific Railway. Field 800×2000 ft.
Ashland. Field 1000×4000 ft., one mile north of town. Field slopes to west. Hill on east side, land north or south.
Salem. Field in State Fair Grounds. Landing space 1800×375 ft. Safe in wet weather.
Corvallis. North edge of town, 800×400 ft.
Eugene. Field 2500×800 ft. sod. One of the best landing fields in Oregon. Northwest edge of town, northwest of reservoir and race track.
Roseburg. Field one mile×1800 ft. Rifle range located ½ mile east of town. Hill at north of field, land to north.
Grants Pass. Field 1500×400 ft., has been graded to remove bumps. Located north side of town, adjoining city. Land to north only.
Lebanon. Field 2000×2000 ft., ½ mile west of the Academy, south end adjoining railroad. No obstructions.
Albany. Field 1200×1200 ft. sod. ¾ mile west of Albany, west of Southern Pacific Railway.
Cottage Grove. Field 900×600 ft. One mile south of and adjoining town, Railway on west end. Land north or southeast. Field very rough-great care should be taken in landing.
Medford. Field one mile by ½ mile. Two miles west of Medford on main highway. Great part of field covered with alfalfa, dangerous in wet weather. Northwest corner of field best for landing.

MEDFORD, ORE,, TO SACRAMENTO, CALIF.—308 MILES.

Practically no fields except absolute emergency from Medford to Dunsmuir. Following down the Sacramento Valley it is one continuous landing field, it being possible to place a ship practically anywhere with care. The principal fields are:

Red Bluff. Flat field, no trees, 2000 ft×1000 ft.

Redding. Prepared field southwest and adjoining town, between Sacramento River and Redding. Field 1000×2000 ft. Care should be taken of the 40 ft. power land north and west of town.

Chico. Field south and adjoining town, land east and west. Trees to south. Slaughter house north side of field.

Oroville. The landing field is about 4 miles south of town, west of and adjoining Southern Pacific Railway. Very large and rough due to placer-mining. Easily located, having one tree in field. Field marked with a 50 ft. circle.

Nevada City. Field about three miles from town in direct line with the Grass Valley. Quite large. Numerous obstructions, however, such as tall trees. Formerly used as race track.

Gridley. Field one mile west of town. Very small, contains several oak trees, landing must be made from north.

Woodland. Open country with numerous landing fields.

Colusa. Landing fields very numerous, all open country. Pilot should observe fields closely as they are under irrigation and are apt to be dangerously soft.

Marysville. Landing field center of race track, formerly used for cross country field for cadets. Land north or south. Gas and oil in building west side of track.

Sacramento. Numerous large fields, also government airdrome east of Sacramento.

SACRAMENTO TO SAN FRANCISCO—88 MILES.

Excellent fields as far as Fairfield. Fairfield to San Francisco the flight extends over the tide lands and bay, it being impossible to land.

SAN FRANCISCO TO FRESNO—198 MILES.

San Leandro. Fairly good fields, possible landings can be made.
San Mateo. Fairly good fields, possible landings can be made.
Redwood City. Fairly good fields, possible landings can be made.
Palo Alto. Fairly good fields, possible landings can be made.
Santa Clara. Fairly good fields, possible landings can be made.
San Jose. Fairly good fields, possible landings can be made.
Los Gatos. Fairly good fields, possible landings can be made.

Care should be taken as this country is thickly cultivated most of the cultivation being orchard, rest under irrigation.

Rocklin. Good field north of town. Good landing fields practically the entire distance between Los Gatos and Fresno. Forest patrol station situated at Fresno, about 2½ miles from city.

FRESNO TO LOS ANGELES—220 MILES.

Visaila. Good field northwest of town.

Bakersfield. Forest patrol station. Good country between Bakersfield and Visaila.

Tulare. Landings can be made in the vicinity of Tulare. Extreme care should be taken, however, as the country is very sandy.

LOS ANGELES TO SAN DIEGO—135 MILES.

An excellent field west of city and just southwest of the oil wells, approximately 2000 ft. from corner to corner. Another field ½ mile to the north of it, approximately the same size. Both fields used commercially and are well marked and graded. Another landing may be made at Arcadia, a few miles from Los Angeles. Good landing field at Venice which is marked.

Santa Ana. Excellent field south of city.

From Santa Ana south, following the coast, there are numerous places where it is possible to land without a crash, no good fields, however.

Camp Kearny. Excellent field on parade ground.

San Diego. Government field, Rockwell, on north island.

SAN DIEGO TO EL PASO—857 MILES.

Possible landings may be made between San Diego and Calexico. There are no good fields, however.

Calexico. Border Control Station western outskirts of town.

There are many possible landing fields between Calexico and Yermo. Soil sandy. Border Control Station at Yermo south of town. Emergency field at Maricopa west of town.

Maricopa to Tuscan, Arizona. Emergency fields the entire route.

Tuscan. Landing field (1) mile north of town. 1 by ½ mile. Very good and marked with a "T."

Tuscan to Douglas, Arizona. The country is level and great care should be taken in landing owing to brush and rocks.

Douglas, Arizona. Landing can be made on the parade ground.

Columbus, New Mexico. Very few fields, country covered by brush. Landing can be made at Columbus on parade ground south of town.

EL PASO, TEXAS, TO FT. WORTH, TEXAS—572 MILES

El Paso. An excellent landing field on the parade ground..

Phoenix. Report landing field in the State Fair Grounds.

El Paso to Sierra Blanca. Many hay fields along the river.

Sierra Blanca to Pecos. Waste country. Can land anywhere being careful.

Pecos to Odessa. Waste country. Can land anywhere being careful.

Odessa. Field half way between Odessa and Midland where safe landing can be made.

Stanton. Good field one mile north of town.

Big Spring. Good field one mile north of town. The country here becomes civilized again and there is an abundance of good fields.

Sweet Water. Excellent, well marked landing field just south of town.

Cisco to Fort Worth. Open country entirely.

FORT WORTH TO HOUSTON, TEXAS—262 MILES

Open country with abundance of good landing fields, can land anywhere.

Beaumont. Landing westerly outskirts of city.

Orange. Landing field one mile southwest of town. Has 8 runways.

Vinton. Landing field just north of big red school building.

HOUSTON, TEXAS, TO LAKE CHARLES, LA.—154 MILES.

Lake Charles, La. Can land at Gerstner Field, which is 15 miles southeast of city. Can land anywhere in this vicinity being careful to avoid gas mounds which are from 30 to 60 ft. in diameter and from 1 to 3 ft. high. Also low places as they are under rice cultivation. Beware of drainage and irrigation ditches.

LAKE CHARLES, LA., TO NEW ORLEANS, LA.—198 MILES.

Jennings, La. Large landing field northeast of city. 8 runways.
Eunice. Landing field half mile due east of town, south of railway.
LaFayette. Landing field westerly outskirts of city.
LaFayette to New Orleans. It is practically impossible to land with safety. The entire country is devoted to sugar cane and rice. The fields are very small and chopped up by ditches. A great deal of this land is flood and tide land.
New Orleans. Landing fields half way between Lake and River at northeast end, business section of town. Present condition very poor, but is being put into fairly good shape.
New Orleans to Christian. Entirely swamp and tide land, unsafe.
Christian to Morse. Many fields but all sparsely covered with trees.
Mobile, Ala. Excellent field 2½ miles southwest of town.
Baton Rouge, La. Reports field 1200 ft. square, a cross in the center south of Standard Oil Company, near the city.
Tallahassee, Fla. Report good field east of Tallahassee about ¾ of a mile Top of one of the largest hills in Florida. Field marked with a "T" with an American Flag at the top of it. Oil and gas can be procured. Field 1000×650 ft.
Mobile, Ala., to Brewton, Ala. Swamps and trees.
Brewton to Montgomery. Farming country. Plenty of landing fields. However, these are very small and should be entered with care.
Montgomery. Good field west of city, well marked.
Montgomery to Phoenix, Ala. Plenty of fair fields within glide.
Columbus, Ga. Plenty of fair fields within easy gliding distance.
Port Valley, Ga. Plenty of fair fields within easy gliding distance.
Macon, Ga. Excellent field in race track southwest of city.
Milledgeville. Excellent field southwest branch of river just west of railroad bridge.
Augusta. Excellent field on parade ground surrounded by open country.
Augusta, Ga. to Columbia, S.C. Ample landing field just south of race track. South of town, open field just east of town.
Charleston, S. C. Reports excellent field in Hampton Park. Used by Victory Loan Campaign. Dimensions not given.
Wilmington, N. C. Excellent field southeast of town.
Pinehurst, N. C. Excellent field due south of Club House. Marked with a cross. Landing in the end near railroad station.
Pinehurst to Raleigh. Open country, landing fields anywhere.
Camp Braig. Excellent landing field on parade ground.
Raleigh-Emporia to Richmond, Va. Country very rough, thickly wooded but containing myriads of small [illegible] here emergency landings can be made.
Richmond to Washington, D. [illegible]ng to Potomac.

e	From To	COURSE AND REMARKS OF FLIGHT	Dist. in Miles

Date and Hour	Machine Type and No.	Motor Type and No.	Names of Passengers Carried	Warming-up Time	Flying Time in min.	R. P. M.	Oil Pressure	Wate Tem

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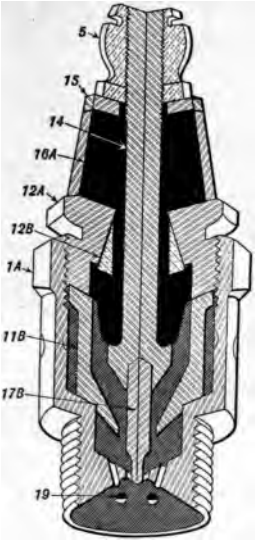

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11B—Thimble
12A—Assembling Nut
12B—Packing Cone
14—Spindle
15—Washer
16A—Mica Core
17B—Electrode
19—Induction Holes

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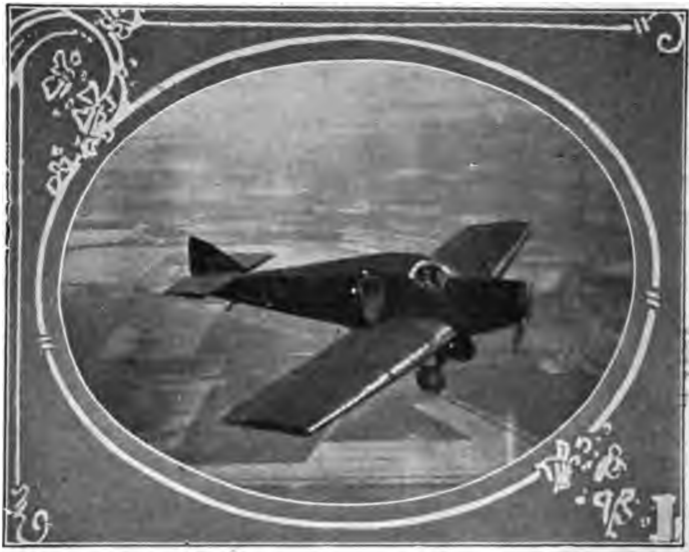

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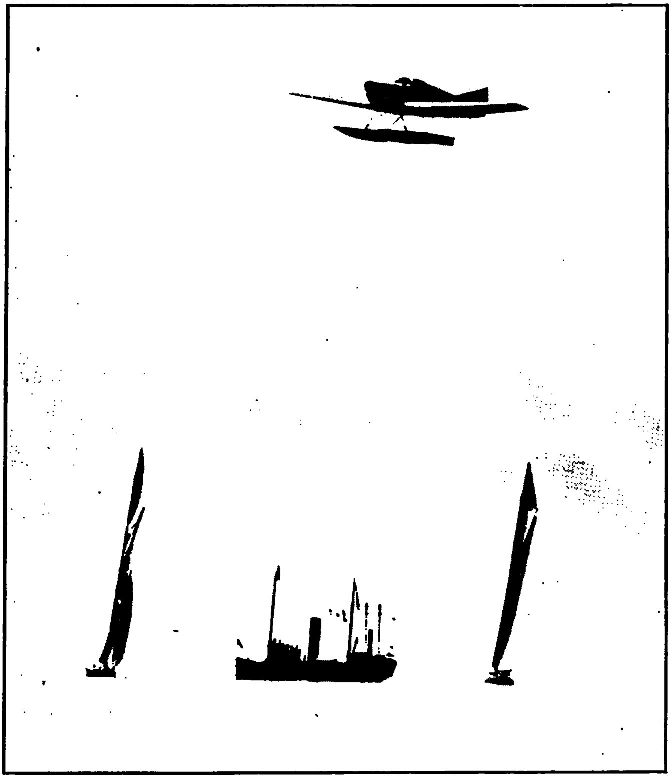

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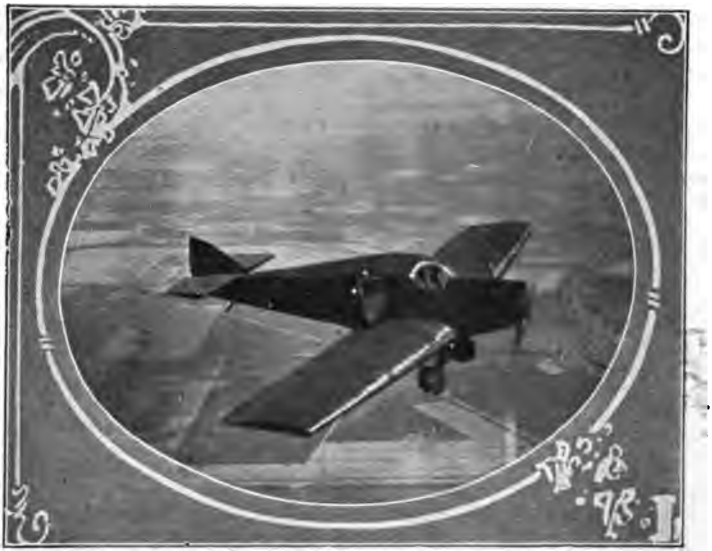
In 10 Hrs. 58 Min.



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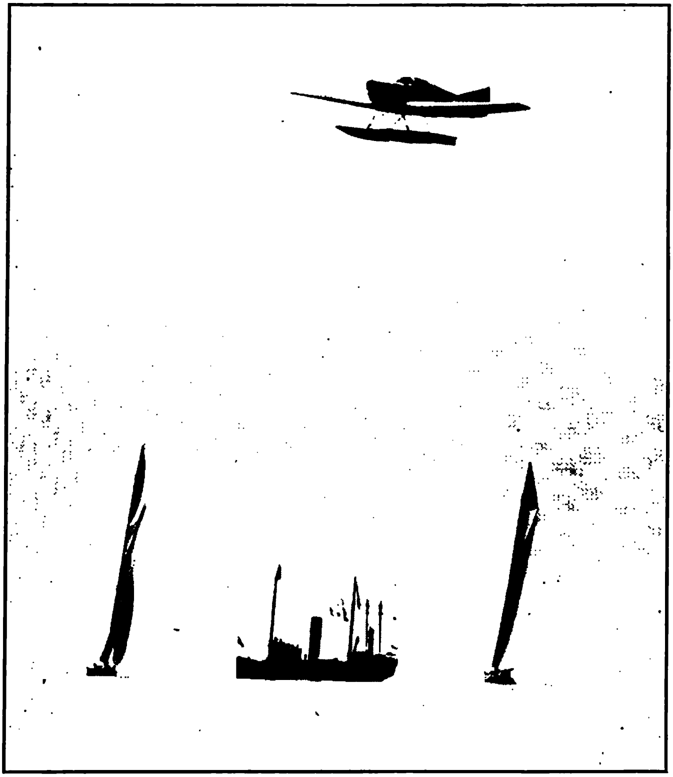

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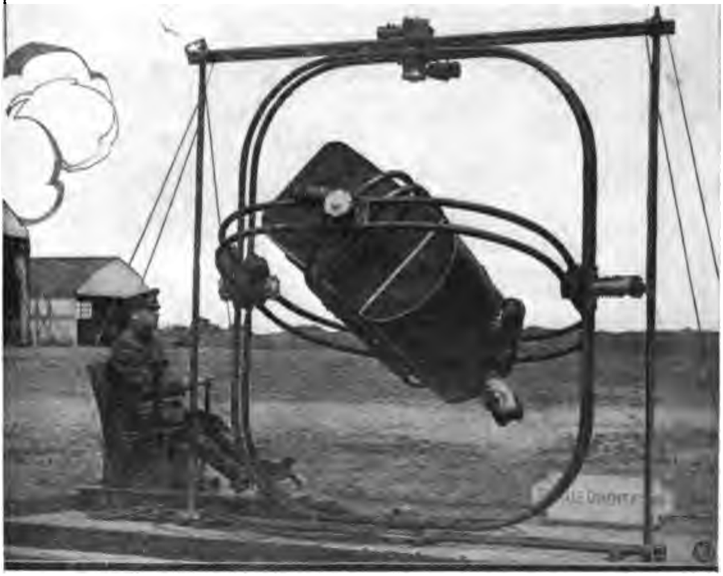

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